JANUARY 1983
ISSUE NUMBER 53

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THE ORIGINAL MAGAZINE FOR TRS-80™* OWNERS

H&E COMPUTRONICS INC.

INTERFACING YOUR TRS–80 WITH OTHER COMPUTERS

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2. Do you ever need to perform statistical analyses?	☐	☐
3. Would you like to have a tool that will allow you greater flexibility in managing your own or your company's money?	☐	☐
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JANUARY 1983 ISSUE NUMBER 53

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REGULAR DEPARTMENTS

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BITS AND PIECES

Howard Y. Gosman

ON THE COVER

This Month's cover reflects one of the hottest topics in microcomputing today—the transfer of programs and data between different models and makes of computers. In this issue, Richard Kaplan's "Program Conversion" column (Part 11) addresses this topic and includes a great deal of information on how to interface different computers, and an excellent BASIC program (written by David Staub of our programming department) that will help translate programs from regular TRS-80 BASIC into CP/M-compatible MBASIC.

We should note here that this month marks the last regularly-scheduled appearance of Mr. Kaplan's "Program Conversion" series. This series has already helped many people convert their programs for different machines, and Mr. Kaplan plans to continue the series, on an irregular basis, as more information is gathered on new computers, operating systems, and transfer/translation techniques.

This month also marks the beginning of Richard Kaplan's new department, a question-and-answer column called "Ask Richard". In his new column, Mr. Kaplan will help to answer the most-often-asked questions about hardware, software and proper procedures for using microcomputers. In addition to drawing on his knowledge of the needs and problems of novice users, Mr. Kaplan will also be glad to answer any questions that our readers may send in. His answers will always be very educational and free from confusing computer jargon. Whether you're new to computers, or have been using them for years, you can still learn a lot from "Ask Richard".

SPECIAL PRICE FOR BACK ISSUE SETS

It's now possible for you to

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The purpose of the *H & E COMPUTRONICS MONTHLY NEWS MAGAZINE* is to provide and exchange information related to the care, use, and application of the TRS-80™ computer systems. H & E COMPUTRONICS, Inc. does not take any financial responsibility for errors in published materials. Users are advised to check and edit vital programs carefully.

The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE encourages comments, questions, and suggestions. H & E COMPUTRONICS will pay contributors for articles and programs published in the magazine.

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THE CRYSTAL BALL

News and Rumors of Interest to TRS-80 Owners

INDUSTRY SHAKEUP ON THE WAY?

The October 18th issue of *InfoWorld* had an article about a seminar and conference attended by dealers, software and hardware developers, Wall Street analysts, and other industry professionals, held in Bellevue, Washington. The conference resulted in two major predictions about the industry and the future of office automation. One was the prediction that, by 1985, all office microcomputers will be linked in local-area networks. When you hook up all of your office computers and peripherals in a local-area network, then all of your computers can pass data back and forth, pass text to one or more printers, and access the same data bases on hard disk drive subsystems.

The other prediction is a good omen for a few computer manufacturers and users and bad news for others. The microcomputer market is quickly reaching the saturation point with so many new computers being made available. In fact, the attendees at this convention feel that this point has already been reached, and that there are far too many makes of computers now available for the market to support. Many of the lesser-known manufacturers cannot compete with the distribution and repair networks of the larger producers, and *most of the present manufacturers will be forced out of the market by 1984*. The picture painted for the future looks like this: according to the conferees, by 1984 there will essentially be only *three* truly successful manufacturers of office microcomputers still in business—the big three are: IBM, Radio Shack, and Apple (and even Apple may be in trouble if their new products don't gain widespread acceptance in the next year or so). IBM is bound to be successful because of their name. Radio Shack has perhaps the best mass-market distribution and repair network in the world, and they have virtually created their own corner of the microcomputer market. Apple, who created one of the very first personal computers, will probably remain secure as one of the industry leaders. Both TRS-80 and Apple users tend to be rabidly enthusiastic about their respective machines, and they each create a great following for these two companies by word-of-mouth advertising. It's hard to say whether these predictions will really come true. But if we had to pick just three microcomputer manufacturers to be the leaders of the decade ahead, we'd agree with these choices.

NEW APPLE READY FOR RELEASE

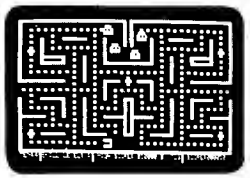
This is the machine that Apple's future will depend on. Some of the best predictions to be found are in the pages of *InfoWorld*, in John C. Dvorak's "Inside Track". Here's one prediction we'd like to pass along: the new Apple "Lisa" computer will be released on January 19, 1983, and the following day an issue of *Byte* magazine will appear, focusing on the new Apple. This computer has been the subject of much speculation and excitement in the industry. Everyone expects that this computer will be a 16-bit machine (68000 processor) with high-resolution graphics, and a "mouse" for cursor movement. The development group working on the Lisa has come up with a good deal of software for the new machine, including a spreadsheet program, word processor, graphics package and elaborate screen-handling software to handle the machine's advanced "window" abilities. Apple is also working on another computer called the "MacIntosh", and there is apparently a great deal of internal competition between the two separate development groups at Apple—up to the point of a $15,000 bet that was reportedly placed between the heads of the two groups regarding whose computer would be ready for release first.

THE FUTURE OF "HANDHELDS"

Many people have been quite skeptical about the usefulness of the new handheld computers that have appeared on the market, while others, who have purchased handhelds, have quickly become devoted

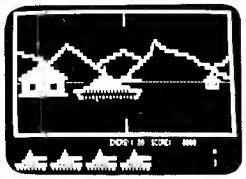
continued on page 6

All photos are actual TRS-80 screens.



SCARFMAN

This incredibly popular game craze now runs on your TRS-80! It's eat or be eaten. You run Scrarfman around the maze, gobbling up everything in your path. Try to eat it all before nasty monsters devour you. Excellent high speed machine language action game from the Cornsoft Group. With sound. Price: A

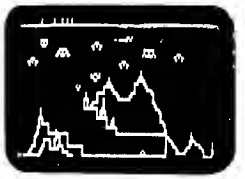


ARMOREO PATROL

A realistic tank battle simulation. Your view is a 3--D perspective of an alien landscape. Maneuver your T-36 tank to locate and destroy enemy tanks and robots that lay hidden, ready to assault you. Clever graphics create the illusion of movement and dimension. From Adventure International. With sound. Price: B

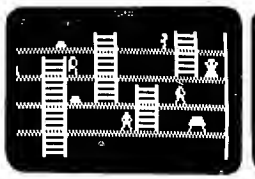
REAR GUARD

Deadly waves of enemy Cyborg craft attack your fleet from the rear. You are the Mothership's sole defender. You have unlimited firepower but the Cyborgs are swift, nimble attackers. Your abilities are tested hard in this game or lightening fast action and lively sound from Adventure International. Price. B



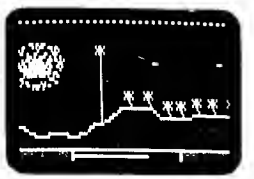
STRIKE FORCE

As the primary defender of a world of cities under deadly alien attack, your weaponry is the latest: rapid fire missiles. long range radar. and incendiary "star shells." Your force field can absorb only a limited number of impacts. A complex game ot strategy, skill and reflexes from Melbourne House. Price: A



PANIK

Trapped at an enemy building site, your fate seems certain. Your laser is empty and evil Mzors are closing in. You'll have to climb ladders and think one step ahead of the various monsters. A challenging game for agile minds. From Fantastic Software with voice (Disk has larger vocabulary). Price: B



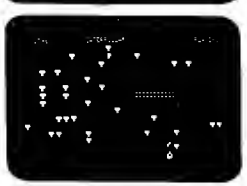
SEA DRAGON

Your submarine, the U.S.S. Sea Dragon, penetrates a mined enemy channel. Armed with missiles and torpedos, you engage the enemy while navigating unknown waters. Succeed or come to a salty end in this game. 29 screens of horizontally scrolling seascrape and sound from Adventure international. Price: B

SAVE 10, 15, 20%

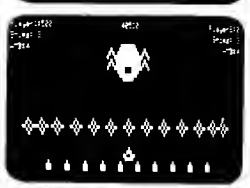
BOUNCEOIOS

Huge boulders careen off the walls. You're in the middle, in danger of being flattened. Keep your wits about you as you blast these "bounceoids" from the screen. Large ones break into many small ones. Clear a screen, and enter a fast-paced challenge stage with a chance for big bonus points. From the Cornsoft Group. Price: A



CATERPILLAR

An arcade favorite! Stop these multi-sectioned crawlers before they creep down through the mushrooms. Zap one and it splits into two smaller bugs, each with its own sense of direction. There are moths and tumble bugs too. It all adds up to lots of fun for kids and adults alike. From Soft Sector Marketing. With sound. Price code: A

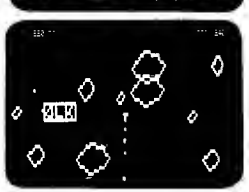


DEFENSE COMMAND

The invaders are back! Alone, you defend the all important nuclear fuel canisters from the repeated attacks of thieving aliens, repeatedly. An alien passes your guard. snatches a canister and flys straight off. Quick! You have one last chance to blast him from the sky! With sound and voice. Price: A

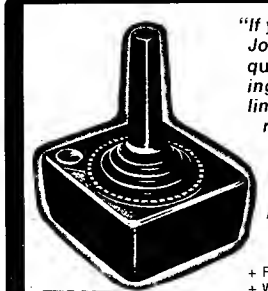
CRAZY PAINTER

You have to paint the floor white. We give you the paint and brush. Sounds easy? Hah! You'll be confounded by stray dogs, snakes, sloshing buckets of turpentine, even a ravenous "paint eater." A crazy. imaginative new game with ten selectable levels of skill for new or seasoned game players. Lot's of laughs. Price: A



SUPER NOVA

Asteroids float ominously around the screen. You must destroy the asteroids before they destroy you! (Big asteroids break into little ones). Your ship will respond to thrust, rotate, hyperspace and fire. Watch out for that saucer with the laser! As reviewed in May 1981 Byte Magazine. Price: A



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–80 Microcomputing 80 Reviews, Jan '82

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14 DAY MONEY BACK GUARANTEE

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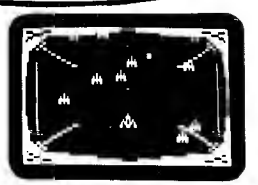
Now you can deduct up to 20% on the price of games: buy any 2 games deduct 10%, buy any 3 games deduct 15%, buy any 4 games deduct 20% from game prices.

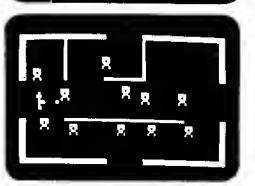
TOP TEN

1. SCARFMAN - *All time favorite*
2. ARMORED PATROL - *Super 3D graphics*
3. PENETRATOR - *Rave reviews*
4. STELLAR ESCORT - *Fast and Challenging*
5. CRAZY PAINTER - *Unique game concept*
6. PANIK - *Remarkable Voices*
7. DEFENSE COMMAND - *Tough struggle*
8. CATERPILLAR - *Good rendition*
9. ROBOT ATTACK - *With voice*
10. SEA DRAGON - *Amazing "Seascape"*



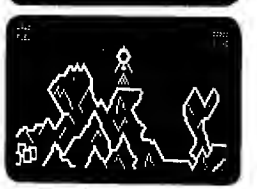
STELLAR ESCORT

The latest super action game from Big Five. As the Federation's top space fighter you've been chosen to escort what is possibly the most important shipment in Federation history. The enemy will send many squadrons of their best fighters to intercept With sound. Disk version has voices. Price: A



ROBOT ATTACK

Talks without a voice synthesizer, through the cassette port. With just a hand laser in a remote space station. you encounter armed robots. Some march towards you. more wait around corners. Careful. the walls are electrified. Zap as many robots as you dare before escaping to a new section. More robots await you. Price: A



LUNAR LANDER

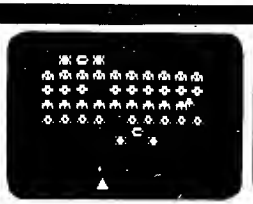
As a vast panoramic moonscape scrolls by, select one of many landing sights. The more perilous the spot. the more points scored -- if you land safely. You control LEM main engines and side thrusters. One of the best uses of TRS-80 graphics we have ever seen. From Adventure International. With sound. Price: A

METEOR MISSION II

As you look down on your view, astronauts cry out for rescue. You must maneuver through the asteroids and meteors. (Can you get back to the space station?) Fire lasers to destroy the asteroids. but watch out. there could be an alien Flagship lurking Includes sound effects! Price. A

OUTHOUSE

You are the mighty protector of this small (but important) wooden structure. For reasons unknown a bizarre gang of miscreants wish to vandalize loot and otherwise destroy the little "half moon house." Your patrol craft has lasers and smart bombs to deal with this terror. From SSM with sound Price. A

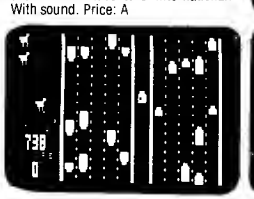


GALAXY INVASION

The sound of the klaxon is calling you! Invaders have been spotted warping toward Earth. You shift right and left as you fire your lasers. A few break formation and fly straight at you! You place your finger on the fire button knowing that this shot must connect! With sound effects! Price: A

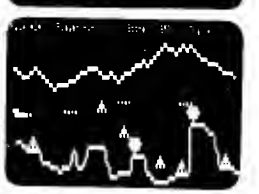
LASER DEFENSE

In this game of ICBM's. high-energy lasers and particle beams. you control the U.S strategic defense satellite system. From your viewpoint high above the globe, you intercept Soviet nuclear missiles in flight and attempt to destroy their scattered missile silos. With sound from MED Systems. Price: B



CHICKEN

Will the chicken cross the road? That's up to you. Can you guide these helpless little chicks across the perilous 10 lane super highway to safety? Or will you bumble. littering the blacktop with a storm of chicken leathers? A humourous yet challenging game of nerves from SSM with sound Price A



PENETRATOR

Soar swiftly over jagged landscape. swooping high and low to avoid obstacles and enemy missiles attacks. With miles of wild terrain and tunnels to penetrate, you're well armed with bombs and multiple forward missile capability. From Melbourne House. Features sound. trainer mode and customizing program. Price: C

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THE CRYSTAL BALL

continued from page 4

handheld-fanatics. Well, a few companies are appearing that will provide the handheld devotees with more power for their handhelds. One of the most popular handhelds is the Radio Shack Pocket Computer II, which is also known as the Sharp PC-1500. It is now possible to get a dual parallel/serial interface for this pocket computer that can give you "desktop computing" power in a pocket-sized package. This interface will let you access a database by modem, send text and programs between your desktop machine and your handheld, or even run a parallel printer from your pocket computer. Atlantic Northeast Marketing can provide a number of great "extras" for your pocket computer—usually at lower cost than Radio Shack's equivalent products. Another item that's sure to be popular is an 8K memory expansion unit for $125 (the dual interface costs $199.95). If you own a Sharp or Radio Shack pocket computer, be sure to contact Atlantic Northeast Marketing at (617) 639-0285. With more products like these, pocket computers are certain to find acceptance among serious computer users.

E-COM ELECTRONIC MAIL — FROM THE U.S. POSTAL SERVICE

E-COM is a new service, offered by the U.S. Postal Service, which enables users of microcomputers to transmit text and a list of addresses to the Post Office by telephone. The Post Office will then transmit the text (a maximum of two pages) to locations near each addressee, where it is printed out, folded and stuffed into U.S.P.S. E-COM envelopes and given next-day delivery. The cost of this service is $0.26 for the first page and $0.05 for the second page, for each letter delivered.

If you need a customized program for transmitting the text and lists of addresses directly to the Post Office, you can get it from COM-CO Communication Consultants, Inc., 900 Madison Street, Seattle WA 98104; (206) 622-6430. They have developed software for Apple computers (which can be converted for CP/M machines) that will allow quick and easy access to the E-COM system.

DIGITIZER FOR 3D GRAPHICS

If you've never heard of a graphics tablet or a digitizer before, here's a quick description. All computer graphics programs create designs by displaying thousands of tiny dots, called "pixels" on the screen. These pixels are organized into rows and columns, so the "resolution" (or sharpness) of the image is expressed by the number of pixels, in rows and columns, that can be displayed. A "540 by 280" screen, can display far more detail than a "290 by 150" screen. Graphics programs always store their images as pairs of coordinates, one horizontal and one vertical. Images that are generated by mathematical means, such as graphs of accumulated data or graphs of equations, are easy to create. To use a program for *drawing* an image, however, is much harder. One method involves moving a cursor around on the screen, leaving a line wherever it goes. Using standard cursor-control buttons to draw in this way is tedious, inaccurate, and time-consuming. Some programs can use a "light-pen" which is touched to the screen, and seems to actually draw images on the screen. Unfortunately, this type of program runs only on extremely expensive graphics terminals. Two other devices have been created which make freehand drawing much easier (and cheaper). One is the graphics tablet. This is a flat surface that has a special grid laid out on it that can sense exactly where you have touched the tablet. When you touch the grid with a special stylus, it causes the tablet to output a pair of coordinates that correspond to the point where your stylus is resting. This allows your computer to display a pixel at a corresponding point on the screen, and to store those coordinates in memory. If you move the stylus across the grid, the tablet will output a continuous stream of coordinates for each point that the stylus crosses, and the computer can "draw" the line on the screen. You can take any drawing, place it on the tablet, trace the design with the stylus, and the drawing will appear onscreen, and be stored in memory (and on diskette, if you wish). If you have a sophisticated graphics program, you can instruct the computer to rotate the finished image, reduce or enlarge it, create a duplicate or a mirror image, add colors, and even distort the image in various ways.

Another device which can be used for the same purpose is a "digitizer". This device is similar in concept to the graphics tablet, but mechanically different. A digitizer usually consists of a jointed arm with a stylus at one end. The other end sits on a table, and may even be bolted down to the table. To use the digitizer, you place a design on the table, then trace the design with the stylus. The digitizer can sense exactly what position each joint of the arm is in at any time. As you move the arm, the digitizer can tell, from the moving arm-joints, exactly where the point of the stylus is. Like the graphics tablet, the digitizer outputs pairs of coordinates to the computer so that your graphics program will be able to follow every movement of the stylus.

So far we've described two methods for creating two-dimensional images. One of the most exciting fields in computer graphics today lies in three-dimensional graphics software. In 3D graphics, each point displayed is defined by *three* coordinates (some very sophisticated routines are used to translate the 3D image onto the 2D screen). These graphics programs can enlarge, reduce and distort images, and also can rotate images *through three dimensions*. Thus, you can take an image and rotate it so that you can see any side of the object, from any angle.

Now try to imagine a 3D graphics tablet. Impossible, right? But the digitizer idea is very easily tranlated to 3D, by adding joints to the arm so that the device now outputs coordinates in sets of three, to indicate a point in 3D space. Such a digitizer has already been created —and it comes with its own 3D graphics software for the Apple II or the IBM Personal Computer. The SPACE TABLET is the creation of Micro Control Systems, and it allows the fast input of x, y, and z coordinates for any object (even if the object doesn't actually exist) and then allows you to manipulate those coordinates. All you have to do is trace the surfaces of a 3D object with the SPACE TABLET's

stylus. You can rotate, rescale and alter images instantly. You can even compose a new image using components of several separate images. This seems to be the first really advanced graphics system developed for microcomputers, and its appearance is a good sign for the graphics industry—which many observers feel has been lagging behind the rest of the microcomputer industry. A three-jointed digitizer for Apple costs $475, and a four-jointed digitizer for Apple or IBM costs $595. Both digitizers include SPACE GRAPHICS software, and the four-jointed version allows complete freedom of movement—just like holding a pen in your hand. Graphics will never be the same—we can expect even more amazing advances within a few short years. If you want some more information about the SPACE TABLET, contact Micro Control Systems, 230 Hartford Turnpike, Vernon CT 06066; (203) 872-0602. ■

BITS AND PIECES

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complete your library of the *Computronics Magazine* at a reduced price. For a limited time only, you can now get the first four years of *Computronics* (issues 1-48) for only $99.95. For five years now, a great amount of valuable information for TRS-80 owners, including practical programs, programming tricks and techniques, and hundreds of useful tips on getting the most from your computer, has been compiled in the pages of *Computronics*. If you only recently began reading *Computronics*, make sure to get the entire series before it goes out of print.

TIME TO BUY A MODEL II?

For those of you who have been considering the purchase of a TRS-80 Model II, now may be the time to do it. Radio Shack has just announced a fantastic price reduction, from $3995 to $2995, to help clear out their inventory and make room for the Model 16.

Should you buy a Model II at all, if they're just being replaced by the Model 16? The answer is yes, because the Model II will be a powerful and useful computer for a long time to come. Even those people who do buy a Model 16 now will quickly realise that they can only run it in a mode that emulates the Model II, using a Model II operating system (an adapted Model II TRSDOS 2.0) and Model II BASIC. The Model 16 creates a lot of excitement, since it is a dual 8-bit/16-bit computer that will be able to run 16-bit software (very fast, very powerful) on its M68000 microprocessor. However, so far the only thing created is excitement. A 16-bit TRSDOS has finally been released so that the Model 16 will actually *run* as a Model 16, rather than as a Model II. Unfortunately, there is as yet no sign of a Model 16 version of *BASIC*. When it does appear, a 16-bit BASIC will presumably have many powerful new features, and will also run much faster than the regular Model II BASIC, but for now, you can't get the new BASIC or any applications programs written for it. So it's probably a good idea to consider the Model II. If you buy a Model 16 now, you'll have to invest in Model II software anyway, and if you buy a Model II, you can get it converted into a Model 16 later.

SCREEN KLEEN

New subscribers to *Computronics*, and those of you who are renewing your subscriptions, will see that we've added a new item to our list of free bonus gifts for subscribing. SCREEN KLEEN is a specially treated anti-static cleaning cloth that keeps your computer in "computer-room-clean" condition. Use this cloth on your dusty CRT screen and it will attract the dust like a magnet. It's also perfect for getting those paper chips out of the dim recesses of your printer. SCREEN KLEEN is a $3.95 value, and will be especially useful for those of you who already have our free program disk and a Nanos TRS-80 Reference Card.

RADIO SHACK'S COMPUTER CATALOG

Do you have a copy of Radio Shack's latest computer catalog? Even if you do, you may not have the complete version of the catalog. Look at the bottom of the front cover of

your catalog. You'll either see the number "RSC8" or "RSC8C". If you have catalog "RSC8", you got the catalog that was designed for distribution to regular Radio Shack stores. "RSC8C" is the catalog that was placed in all Radio Shack computer centers, and it has a few more items than the other catalog. Except for the numbers, however, the catalogs look alike.

NEW BOARDS EXPAND THE CAPABILITIES OF TRS-80 COMPUTERS

Owners of TRS-80 Model I or III computers will be interested to know that they can convert their computers, with a new board called MICROMERLIN, into an IBM-compatible computer. This new board effectively turns TRS-80's into IBM PC's. The board includes it's own 8088 microprocessor (16-bit), plus 64K of RAM that can be upgraded to a total of 256K and 8K of EPROM (Erasable Programmable Read-Only Memory). When active, the MICROMERLIN board uses the TRS-80's native Z80 microprocessor as a "slave" processor to access the keyboard, disks, and input/output ports of the computer, while the new 16-bit 8088 chip does the computing work. The MICROMERLIN board costs $1195 (and up), and the price includes a CP/M-86 operating system. For more information, contact Micro Projects Engineering of Culver City, California: (213) 202-1865.

For a considerably lower price, you can get a board that makes your TRS-80 Model III compatible with the CP/M operating system, and raises its memory capacity to a full 64K. The SHUFFLEBOARD is easily installed—it plugs directly into two existing sockets inside the Model III. This board will give TRS-80 owners the benefit of the vast library of CP/M programs, without interfering with normal operation under the TRS-80's native operating systems (TRSDOS, NEWDOS, LDOS, DOSPLUS, MULTIDOS). Once installed, the computer will sense what format disk is being used when starting up, and will automatically switch to the correct mode. The SHUFFLEBOARD costs $299 and is available from Memory Merchant of San Leandro, California; (415) 483-1008.

TRS-80 SOFTWARE SPEEDS UP BASIC

TRASHMAN is a machine language utility for the Model I and III that can reduce BASIC's string compression time by 95 percent (according to PROSOFT, the manufacturer). TRASHMAN needs only 578 bytes of memory plus 2 bytes for each active string. It works with other machine language programs and with all major operating systems. It comes with complete instructions, and can be copied to your own disks. In testing, TRASHMAN's efficiency increases with the number of strings dealt with: to compress 250 strings, BASIC normally takes 11.8 seconds—with TRASHMAN, only 0.7 seconds are needed (a 94 percent improvement). Compression of 2000 strings normally takes 713.2 seconds, while with TRASHMAN, only 7.8 seconds elapsed—a 98.9 percent improvement in speed. TRASHMAN is available on diskette for $39.95. For further information, contact: PROSOFT, Box 560, North Hollywood, CA 91603; (213) 764-3131.

DOES YOUR COMPUTER HAVE A LISP?

UOLISP is a complete programming system for the serious microcomputer user. It uses a large subset of Standard LISP (a proposed standard for portable LISP programs). The system was first implemented in 1976 and has undergone near continuous development and debugging since then. The result is a finely tuned system and a large body of supporting software. UOLISP is not just a LISP interpreter. It comes complete with a compiler, an optimizer, and over 100 pages of documentation. The system includes a number of precompiled packages which can be loaded singly or in combination. The TRS-80 version, priced at $109, is available for the Model I or III and can be configured to run on either 32K or 48K systems. For more information, contact Far West Systems & Software, Inc., at P.O. Box 3301, Eugene, Oregon 97403; (503) 485-5155.

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RADIO SHACK WILL SUPPORT INDEPENDENT SOFTWARE DEVELOPERS

Radio Shack has apparently reversed its long-standing policy of discouraging independent software authors. Perhaps they took a hint from IBM, which has handed the job of software development over to outside sources, who can submit programs to IBM for their seal of approval and marketing marketing resources. Radio Shack has always seemed to feel that any outside sources of software or hardware are undesirable competition. In fact, the many products available from these outside sources have only served to make Radio Shack hardware more appealing to customers. Maybe they've been looking at magazines like *80-Micro* with its monthly 400-plus pages of products devoted to the TRS-80, and realizing that there is a much larger market for TRS-80 software than they can address without outside help. So now Radio Shack has initiated a Software Review Program that will evaluate submissions from outside software authors, for possible inclusion in the Radio Shack Application Software Sourcebook and other listings. Radio Shack has finally decided that it would be a good idea to present their new and prospective customers with information on a far wider range of software sources, and this will undoubtedly help their sales.

Software developers have also been faced with another problem that will now be solved. In the past, it has been illegal to market a program disk that contains the TRSDOS operating system. You could sell a TRSDOS-*formatted* data disk with your programs on it, but your customer would have to supply an operating system. This is one of the main reasons that developers of alternative operating systems (DOSPLUS, NEWDOS, LDOS, etc.) have been so successful. These vendors have made licensing agreements with other software developers, so that you can buy applications software on a disk that will boot up by itself. The only problem is that some users (especially novices) become familiar with TRSDOS and are very reluctant to try a new operating system (despite all of the criticism TRSDOS has received, the newer versions of TRSDOS are very good systems for novices, with a very wide range of features—especially the HELP feature that describes the proper syntax for any DOS command). Well, to make a long story short, Radio Shack is ready to start licensing TRSDOS to outside developers, so that authors will now be able to sell their programs on self-booting TRSDOS disks. ■

LETTERS TO THE EDITOR

Wrong Number?

I just called the Bulletin Board you had listed for Orlando Fla. (305-830-8194) in *Computronics* July 1982, and they said it was a private residence, not a bulletin board, so that number must be a mistake. Will you try to get me the right number and any other numbers in the Orlando area? Can you call any of them and get a high-pitched tone like on "The Source" or "Micronet"? I get them both, and then just get instructions from the computer screen. I called nights and on Sunday, like the instructions said, and got no answer. When I called during the week, someone answered and said it wasn't a bulletin board. I'll appreciate any help because I can't afford much of "The Source" or "Micronet".

Bill Rawls
P.O. Box 114
Plymouth, FL 32768

Unfortunately, it is not possible to give a complete list of bulletin board numbers without including errors, because people frequently change their numbers. There is a magazine called LOG/ON *that publishes updated lists every month. Their address is 1405 Krameria Street, Office 3-C, Denver CO 80220. Also see Spencer Koenig's* Beginner's Corner *this month.*

Where to Find a Book?

I read your review of *Intermediate Programming for the TRS-80 (Model I)* in the September 1982 issue of *Computronics* with great interest.

Unfortunately I was not able to find the name and address of the publisher, nor anywhere could I obtain the book or find out the price.

May I impose on you for the information?

Frederic A. Powers
2374 Madison Road, Apt. W2F
Cincinnati, OH 45208

I think that this book is published by Tab Books, Blue Ridge Summit PA 17214; at least Tab publishes other books by Heiserman. However, finding recent books is frequently a problem, and Radio Shack often doesn't carry them. We recommend that you subscribe to magazines like this one and look through the advertisements.

Questions for Beginners

I was delighted to see that the "Beginner's Corner" is continuing. The previous author, Sherry Taylor, did quite well, but she had to stop for personal reasons, and I feared it would not be continued.

I am a private practice psychiartist who has bought a Level II Model I TRS-80 over a year ago. I have convinced myself that I need to get the rest of the peripherals in order to gear up to have a small system to handle all my bookkeeping, insurance forms, etc. — since

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PROGRAM PREVIEWS

A. A. Wicks

This Month: Maxi C.R.A.S. and Data-Writer

For several months now, I have had on my review agenda a program named Maxi C.R.A.S., published by Adventure International. From media advertisements many readers will recognize that this is not a game program (unless keeping track of accounts payable is a game!), but is another of the business and personal series of programs that are being released by the business division of Scott Adams, Inc.

It is unfortunate that I have not been able to review this one earlier, as it is an excellent Check Register Accounting System (hence, C.R.A.S.), and is well-deserving of favorable publicity. But another check register program? Well, it is just not "another" one — it has features and capabilities that make it extremely useful to the individual user and small business that may operate with personnel not familiar with computers beyond the keyboard. Let's take a good look at this program.

Working with the program and following the manual go hand-in-hand, at least initially until familiarity with the program has been gained. This should not be long (perhaps only once through), partly because of the explicit instructions that are provided, and partly because of the menu-driven format and on-screen documentation. The program comes with an operating system already installed on it, so there is not the problem, which is frequently the case with published programs, of having to install an operating system with the new one. The operating system is TDOS, a subset of the well-known and respected DOSPLUS 3.3. (DOSPLUS at this writing now has version 3.4, but there have been no changes in TDOS.)

After some preliminary system initialization, which will be mentioned presently, the program commences by displaying a nine-item screen menu presenting every function that the program provides. In selecting some of these items, a sub-menu may be presented, so that the step-by-step functions will not be confusing. A data disk is required for the records to be maintained, and the first function that the user needs to do will be to initialize this disk. The disk will end up having such information sectors on it as, "Name of Checking Account," "Name of Bank," "Number of Checking Account," etc. The date of the beginning of the account is also required, and may be a past date, or current date or any fiscal date selected. At this point, the dialog requests the number of accounts planned for use, and their titles. Maxi C.R.A.S. will allow up to 223 accounts, divided by your choice between income and expense (maximum dollar amount per transaction can be as high as $99,999.99.) Factors such as this should be given some thought ahead of time — for instance, you might wish to have expense account categories for Vehicles, with subdivisions for Fuel, Installment or Lease Payments, Repairs, Parking, etc.

You will also need to separately note these account numbers and names for your initial planning, because they will be required in replying to the next question regarding Opening Account Balances. These balances may be zero or any amount you indicate. Following these entries, you are given the opportunity to have a printed record of your Chart of Accounts. Doing this is strongly recommended, and it may then be kept handy for reference.

Should you wish to change any of the Account Titles you may do so at this time, simply and quickly by editing. Merely type the letter "E" and <Enter>. The number of the account is then entered and the title corrected — and Maxi C.R.A.S. corrects the title in memory. Doing this later is only slightly more involved; an option on the menu "File Maintenance," provides one of the sub-menus and from there it is an easy step to editing the account titles.

From this point on, you will be actively engaged in entering your check transactions such as: checks

written, deposits, automatic withdrawals, service fees, etc. You may also enter Memo Transactions — those that permit you to transfer funds from one account to another. A check transaction may be distributed over multiple accounts, such as one check being assigned $28.00 for vehicle fuel to one account, but a $4.50 windshield wiper blade assigned to another, even though they were both placed on the same bill by the dealer. This is most convenient — especially when there may be four or five accounts involved.

Pursuant to the foregoing, Maxi C.R.A.S. has a function known as the "pro-rata loop," which allows you to pro-rate a transaction over mulitiple accounts on a percentage, or a fractional basis. For example, suppose you have a check for $100.00 that you wish to distribute over three accounts — 50% to Account 10, 25% to Account 14, and 25% to Account 18. Basically, you and the computer work this out as you would on a calculator, with the computer doing the math in this case. The final result is a display of the distribution. Fractionals are handled similarly, with denominators and numerators being asked for by the program.

After allocations, Maxi C.R.A.S. will request "note" information, if you wish to add this. For instance, you may need a brief message entry to flag special items for future reference, such as tax deductible items. Or, as one note that I required, the flag for a purchased item expensive enough to permit a special sales tax deduction at tax time. Such notes will be saved to disk and also will be printed if needed.

Finally, following complete entry of a transaction, you will be asked if you verify the entry. An affirmative will save the transaction to disk, a negative will erase the transaction and permit re-entry. Although backspacing and retyping will allow coprections to be made as typed in (until <Enter> is pressed), the preceding is the only way to re-do an entry.

Memo Transactions were briefly mentioned above, and should not be confused with Notes. Memo Transactions allow you to move a transaction from one account to another, as was stated earlier — but these will not affect the overall balance. There are numerous occasions when Memos might be necessary. Possibly you discover that a particular expense has a portion of it that is important enough to be assigned its own account. This is accomplished by typing "Memo Entry" when asked for the name of the Payee/Payor. When the amount of the transaction is requested, a zero ensures that the Check Register Balance will not be changed by the subsequent transaction entry.

Deposits assigned to an account are processed the same as checks, but of course, these are credits to an account. A Checkbook Balance report may be obtained at any time by simply typing "B." This is a report of the balance between checks written and funds on deposit, and is not the same as another report — "Checkbook Reconciliation." The latter reconciles the Maxi C.R.A.S. balance with the bank's statement, and is a menu option that will be mentioned again later.

There is a convenient enhancement to Maxi C.R.A.S. during the entry of transactions, which will be of interest. During "File Maintenance" one of the options allows the entry of two lines of information, starting with the payee's name. This information is retained on file, on disk. Then, when a transaction is being entered, Maxi C.R.A.S. automatically prints the information that is in the file. This function may be negated if desired. The practical application of this will be described later on, too.

When a disk is full, Maxi C.R.A.S. will close that disk. This requires that the transactions in progress at the time be transferred to a new disk. The instructions in the manual for doing this are explicit, and even for an inexperienced person this operation should not present a problem. Similar procedures are followed for beginning a new fiscal year.

When the "Print Checks" option is selected from the main menu, all outstanding checks will be printed. There is a choice between using single checks, or continuous form checks. If the form checks are used, Maxi C.R.A.S. is configured to print on NEBS' Style 9020 checks. A sample of this check, a price list, order form

and postage-paid envelope are included with the Maxi C.R.A.S. program for your convenience in ordering these checks. Incidentally, the checks and printout are formatted to allow the use of window envelopes, thus avoiding envelope addressing. Your company return address also shows through if a two-window envelope is used. (These too, are available from NEBS, on the same order form.)

Before commencing printing, Maxi C.R.A.S. will perform a test, if desired, which will ensure that the continuous form check paper is properly aligned in the printer. I was not able to personally check this on check forms (not having any). But the test, as made on blank paper, met the specifications stated in the manual. It would be wise to check the printing at intervals as it is being done, to make sure that slippage or creep is not occurring with your particular printer. Checks are numbered as you specify. Maxi C.R.A.S. will not reprint a check, so when the computer returns to the main menu, you know all check transactions have been printed.

Maxi C.R.A.S. stores the mailing address of up to 40 payees, and automatically prints them on the checks. Four lines of information is permissible, as was previously mentioned. If the name on the check is exactly the same as in the file, Maxi C.R.A.S. will print the following three lines without further operator guidance. This, together with the window envelope can be an excellent office time saver.

The preceding functions are only the basic ones performed by Maxi C.R.A.S., mostly to get the data into the files. Now, with a data base in operation, you may request all or any of several useful reports, as printed output. Without going into the operating detail (which is quite minimal), to produce these reports, suffice to say that they are as follows.

Option 1 is a Check Register Statement, which is a check register report for any month selected (or all transactions thus far for the current month). This printout is insurance, you might say, in the event the data disk is damaged — at least a record will exist — and should be maintained for historical record if nothing else. Printout is 160 columns wide, printed on two pages. However, by placing it in a binder as left and right sheets, the statement may be read across the two sheets. This is one function that will possibly prove awkward for users who have a printer of greater than 80-column capability. No information is provided that will permit these users to modify the printout to have their printers accept this report straight across the sheet.

Option 2 permits printing your check register notes, as previously discussed. Option 3 prints Income and Expense Totals. This is a well-presented layout. In addition to the usual and necessary company name, bank name, date, etc. the heading columns are: Account No., Account Title, Opening Balance, Monthly Subtotal, and Closing Balance. A glance at this report provides a wealth of financial information to the user.

Option 4 performs a printout of a selected range of accounts over a selected period. An inspection of this report will indicate trends of spending, for instance — why are you spending so much on paper clips? And there is no reason why the information provided cannot also be used for graphical analysis, if that is your bent.

Option 5 will allow you to post all transactions that have cleared the bank, printing out a most complete reconciliation statement. This includes a list of checks not yet cleared and deposits not credited. A summary statement is shown at the bottom of this report. For me, this is a report of great value — there are always checks issued not yet cleared, or deposits not current with the bank statement. Rather than puzzling through the bank statement every month, a rapid review presents my current fiscal status at the bank, instantly.

The last option, 6, provides a detailed audit trail of how each transaction was distributed over each account. It will be obvious that this report can be of definite value at tax time.

On some of these reports, be prepared to wait while the data is located and printed — some of them take some time. This is probably due to

the method of search within the program, but recognize that this problem may occur to a greater or less extent, depending upon the number of transactions involved.

I cannot vouch for the utilization of Maxi C.R.A.S. with Visicalc, but according to the manual, using the data in the check transactions, Maxi C.R.A.S. will set up a preliminary file readable by Visicalc. For the uninformed, Visicalc is an electronic spreadsheet program useful in making financial projections and other considerations. In using it with Maxi C.R.A.S., Account Names will be placed in ascending order in the first column, opening balances in the second, and up to 12 monthly balances in the remaining columns. The Visicalc-readable file is selected by option, using a program from within Maxi C.R.A.S., for either the Model I or III. Detailed instructions for Visicalc operation are not included in the manual, this being more properly a function of Visicalc, once the Maxi C.R.A.S. file has been read by the former program.

As is customary with these reviews, I would now like to review the manual that accompanies Maxi C.R.A.S. I would like first to say that it is a pleasure to do this. It is an unfortunate fact that with all of the software that is on the market for the Model I and III computers, so much of it is provided with inadequate, illiterate documentation — and this applies to some of the best programs available, too. But occasionally, some excellent manuals are surfacing — I hope that this is a trend. Adventure has reached the zenith with this manual, as brief as it may be. (Data-Writer, noted also this month, is another.)

The manual is written to and for the program *user,* who is neither a programmer nor necessarily the company or household accountant (although they will use the output). In other words, an operator can work with Maxi C.R.A.S., but the financial people will hail the usefulness of the reports. Particular attention has been given to the operator of the Model I or III in getting started, making backups, and avoiding the wonderments and frustrations of trying to do something while not on quite familiar ground. Six pages of information is provided to users in this respect. Only eight pages are required to describe the entry of transactions, and three pages on preparing printouts. This brevity does not imply that the documentation is insufficient — rather that there is clarity in a minimum of words. Additionally, this succinctness is aided by having every important reply-example to the interactive dialog displayed in the manual as a reversed (white on black), block. This is used for such as <ENTER>, 011-67341-223 (example account number), etc.

In addition to the instructional portion of the manual, a "technical information section" shows a flowchart for an overview understanding of Maxi C.R.A.S.. Also, within this section is a complete listing of all of the programs used in Maxi C.R.A.S., and what disk they are on, for both Models I and III.

There are six appendixes, all of them sample printouts of reports obtainable from Maxi C.R.A.S.. These are actually reduced printouts, and have been originally printed by daisy-wheel printer, therefore the reproduction is excellent. The Index, all on one page, is complete. Each part of the manual has been given a section number, so that pages are referred to as, e.g., 5-2. This permits rapid reference to the exact location of a sought-after item.

The manual pages are composed and printed by the typeset process on stiff card stock, 5 1/2 by 8 1/2 inches. These pages are inserted in a sturdy, gold silk-screened, brown three-ring binder, 9 by 7 inches. This binder has front and back inside pockets in which the disks are inserted for shipping and use, if desired.

The manual was written by Paul S. Grupp, who is to be complimented for his concise and excellent instructional style. All of this leads to the manual receiving a "10" on our 1 to 10 scale — an unusual occurrence, as has been mentioned, but encouraging.

The program was written"by Dale Kubler, of Exador, Inc., and who is considered by many to be the guru of data base management programs. He has again produced an excellent program, which as far as my analysis of it is concerned, is free of problems and which features many of the speedy routines established in his previous success, "Maxi Manager."

Overall assessment of the program is that it is a gem. There are bigger and more complex programs available, but this one happens to be just what the accountant ordered for the small business operator, or personal use. I recommend it unhesitatingly.

Maxi C.R.A.S. is available for both the Model I and Model III computers, requires 48K of RAM, two disk drives, and an 80-column printer, as a minimum system.

Maxi C.R.A.S. – Adventure International, Longwood, FL 32750, or available through H & E Computronics, Inc. – $99.95.

Data – Writer

Several months ago (*Computronics,* May 1982), I reviewed an interesting and practical program called "Auto-Writer." Several weeks after this appeared, I received a copy of an updated and renamed version of the program, which has been renamed "Data-Writer." This program in its revised version is now published by Software Options, Inc. of New York, N.Y., and, as before, is written by David S. Walonick.

Although I have been wanting to apprise our readers of this revision of the program before now, other review commitments have prevented this. But, I am anxious that you should know about it, partly because I am enthused with the new version (even more than I was with the original), and partly because in many respects there has been a radical improvement and expansion of this program and its associated focumentation.

Initially, I will state that I am not going to review the program in great detail, because my first review did that quite thoroughly. However, I will mention the changes and improvements, for your benefit.

Because it is the most visible improvement, the manual should be mentioned first. Those of you who read the first review, recall that I was not unfairly critical in my comments about the manual, and I am sure that anyone who purchased the program would agree with those comments.

The new manual is unrecognizable as to any relationship with the first — physically and literally. The writing style is exemplary — it's unfortunate that more manuals are not written as this one is, and my comments in the Maxi C.R.A.S. review on this subject are sufficient in this respect. The approach of this manual is to a non-computer-oriented person of intelligence, and the information is imparted in modest sentences and short paragraphs that ensure that the reader will have no problem in absorbing the content.

Excellent directions are provided in making up backup copies (yes, you may — in fact, it is encouraged for your own use), of the ten programs in the system. These unequivocal instructions are provided for Model I and Model III users, and further instructions are provided for using the program with TRSDOS, DOSPLUS, NEWDOS 2.1, NEWDOS/80 v. 2.0, LDOS and DBLDOS, in any single or double density format available. For the Model III, the DOSPLUS subset TDOS may be provided on the system disk, if requested. In this event, there are further good explanations of TDOS operation for the Model III user, together with instructions for transfer of programs from TRSDOS disks. There are a number of automatic patch functions on the Data-Writer disks for various modifications to the different systems.

Following this, the manual provides a thorough introduction into data base systems, because that, after all, is the focus of the program — it is a data base management or information processing system vehicle, but in the unusual sense that *you* create the format, before you use it for your own data base. The manual then goes on to explain the functions and method of using each of the system programs.

The manual is physically structured for ease of understanding. Headings are Bold, subheadings are Bold in smaller type, and the text is large enough for easy reading. Examples are quickly identifiable as such, and stand out from the other text. Overall page size is 5 1/4 by 8 1/2 inches, and this is neatly bound in a three-ring, attractive hardcover plastic binder, 6 1/2 by 9 inches. Pages are on gray, heavy-weight card stock, printed double-sided, and the size and shape of the manual is ideal for desk use at the computer. Front and back inside pockets are provided in the binder for disk storage.

The program has been expanded to a considerable extent, with many new features added. Some modifications to previous subprograms have also occurred, and some of these changes have produced far greater flexibility than with the program's predecessor. One important addition is a subprogram called MATH, that allows you to define fields as equations, and thus permits you to calculate any fields in the data base by using addition, subtraction, multiplication, division, and exponentiation. Field Labels and number may be freely mixed, and 20 equations per run (each equation up to 255 characters), are permitted. Furthermore, there are ten temporary storage areas for intermediate results. All MATH procedures are in double-precision arithmetic, and equations may be stored on disk. Needless to say, this is an extremely useful adjunct to Data-Writer. I was able to use the MATH function of Data-Writer in developing a rather complex stamp collection data base. Lest you consider this a mundane application, I should mention that this was not an ordinary hobby-type file, but rather a complex investment analysis data base for a catalog value of several thousands of dollars. Each record supported 17 fields, and MATH effectively performed multiplication and addition totally based on equations of fractional-cent values, and on varying quantities of stamps over a scale of 500 different catalog numbers. REPORT (another subprogram in Data-Writer, which was described in the previous review), printed the information as required, with the only restriction being a hardware one — compressed character printing was required in order to keep the printout within the confines of the printer width, normally 80 characters at my location.

Another new adjunct to this program is LABELS. This is not entirely new, but may as well be — having been

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PROGRAM PREVIEWS

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improved extensively. Mailing labels may now be printed one- to four-across on your printer. It is possible to create a label format file and save it on disk for future mailings, and data bases may be chained during printing. The data for the labels may be added, deleted, or modified at any time. There is a considerable amount of printing flexibility with this subprogram.

Three other programs have been brought out and expanded under new subprograms. These are ENTRY, allowing the addition of data to your data base; EDIT, for changes; and MANAGE, for manipulation of the data base. These functions were possible with Auto-Writer of course, but as separate subprograms. Now there is a greater ease of operation while performing these functions. In the case of ENTRY, this useful adjunct to Data-Writer stems from the fact that it is not an absolute necessity to use a word processor to create a data base, within certain limitations. If you requirements do not exceed the need of more than 35 characters each in a field, ENTRY will handle it alone; at the same time permitting validity checks, an abbreviation table, repeating fields, etc. On the other hand, using a word processor allows Data-Writer to recognize and support variable-length fields up to 240 characters.

STATS, for data base verification; SELECT, for preparation of subsets; SORT for ordering the data base; LETTERS, for creating form letters; and, REPORT, for the preparation of printed reports, essentially perform the same functions as with Auto-Writer. However, having gone through the test of field operations, some "bugs" have been detected and removed.

Along these lines, Software Options, Inc. has issued a "newletter" supplement with release No. 1 dated July 1982. This publication, according to the first edition, will be devoted to the description of new offerings by the company, notes and cures of any "bugs" or quirks in their programs, and descriptions of new applications for users. Although the first edition is largely devoted to deficiencies uncovered by the producers and users of Data-Writer, there is mention made of an Appendix to the User's Manual, that will include sample field labels to use for various applications. Because this is probably the most lengthy procedure required in using Data-Writer, this application will be welcomed by the users.

The program problems and peculiarities just mentioned, have, in several instances, been corrected in programs released to date, which indicates Software Options is maintaining currency as rapidly as errors are reported. In fact, as I was starting to use the program, a new set of disks arrived that had been released to correct several small deficiencies. Nevertheless, no deficiency can be considered "small" — so this type of support is a favorable indication of the integrity of the publisher.

As with Auto-Writer, you word processing program may be used in the creation of your data base. SCRIPSIT, Lazy Writer, or Electric Pencil are typical of systems that may be used. However, the built-in program ENTRY has a number of advantages when adding records to a data base, that far surpasses the use of your word processor for this purpose. The subprogram provides validity checks, including such niceties as numeric checks for "all numeric" entry confirmation, ZIP code check, and length checks.

Abbreviation-expansion, also within ENTRY, is a real speed-up feature. For instance, when entering data, the letter C could be typed whenever the city of Cincinnati might be required in a "city" field. This would immediately be expanded to the full name. Again within ENTRY, "Dollar Formatting" will allow any number entered to be instantly formatted to two decimal places. Example: 14 becomes 14.00, giving the keyboard the facility of a calculator. Anyone with an amplifier-speaker attachment to their computer installation will receive an audible alarm signal if an invalid entry is attempted to a validated field during the use of ENTRY.

MANAGE, another addition to the program as briefly mentioned, permits complete restructuring of any existing data base previously created by Data-Writer. Fields may be deleted, created, re-ordered; data bases may be merged, or bifurcated. In thus splitting the base, as in the latter function, MANAGE will order the two files in the character size that you select, with a report provided as to how many records end up in each file (a record will not be split within itself, in any case).

No need to use your word processor for editing if you do not wish to, with the availability of EDIT within Data-Writer. This program has been documented more fully than with the previous release, thus allowing the user to take advantage of its many speedy features without working through a word processor.

Technical support requests are welcomed by Software Options, Inc., the user is assured, but with the now complete and clear documentation, this should be minimal or not at all for most users.

When I commenced this program re-review it was intended to be exactly that, and brief. But as I worked with the program my enthusiasm for its capabilities and flexibility carried me away, and I have, therefore, provided more comments than first intended. For those who may consider this program for purchase, I encourage you to check the previous review for more details on features not expanded upon here, or, better yet, contact Software Options, Inc. The one point that I wish to emphasize however — here is a program capable of outstanding performance in the preparation of any type of data base, and which may be accomplished easily and without any previous computer software experience being required of the user. I recommend it without qualification.

@fg Data-Writer – Software Options, Inc., P. O. Box 970, Bowling Green Station, New York, N.Y. 10274. For TRS-80 Models I, III (48K, two disk system, lower case required. Available at most suppliers, H & E Computronics, Inc., or direct from publisher. – $125.00 plus $3.00 shipping. ■

BEGINNER'S CORNER

Spencer Koenig

Clubs: If You Can't Beat 'em . . . (Get It)

Hello, and welcome to the meeting. I know that some of you haven't been here before, so let me introduce myself. I'm Spencer Koenig, and I'm the president of the B. C. of A. (the Beginner's Club of America). What we try to do here is help you's become informed and stay that way. We accomplish this in two ways. The first is to give you great information and leads to foister that information. The second is by the use of mild coercion (we threaten to break both your legs).

Well, now you know what it's like to belong to a club or, should I say, to go to a club meeting. As a certain Mr. Hope used to say "but seriously, folks,", that's not at all what it's like. Of all the ways of learning the ropes, going to a club meeting that deals with your specific interest is by far the best. In my column I've covered books and bulletin boards as my two main means of meaty micro morsels. (WHEW! LORD HAVE MERCY on the letter M) Now we come to a topic that should prove that that the micro is mightier than the mild mannered (not again!) manipulator (Oh pity please!).

If you've had the experience of sitting alone trying to solve the mysteries of the micro, or begun the foolhardy task of reading and deciphering the treacherous and intellectually shark-infested waters often referred to as professional and CLEAR documentation, then take heart. If you've often felt despondent because the instructions to a game described the game as "even a child could do it" and found that a child could do it but you couldn't, then take heart. If you've had the unlucky misfortune to believe the first paragraph of an assembly manual, to put together some innocent looking piece of wizardtronics (my own invention), which stated "this should take you 15 minutes" and you're still trying to figure out the diagrams to get the package open after a week, then by all means take heart.

If you've had any experiences remotely like these, then know that at worst you are not alone, and at second worst misery loves company, but at BEST there is a solution (if I could only remember what it was ... OH YES), join a club today, or as soon as possible. There you will find success in someone else's keyboard ingenuity.

They, your fellow members, will hold the key to beating the pants off the neighborhood kid with the unbelievably high scores. The usual methods of course no longer apply. So, you find out that there is indeed a bug in the game that allows you to position yourself on the screen, and therefore find that you, too, can score in the millions (yes millions, as in Adventure International's ARMORED ATTACK). Oh, the feeling of revenge as you pound the pulp out of that mediocre microdot muncher's ego. (I'll bet you almost missed that one.) Who cares if the kid's only five years old and got the scores legit. That's not the point. Am I right or am I right?

Besides, if you really feel bad, you can tell him later and make it up to him by getting the latest in someone's never ending challenge series that's always just around the corner. OK, on to my next point: (1) Where do you find these clubs?

The first club that I joined was the New York Amateur Computing Club. I found it by accident when I came across a flyer in a computing store called DIGIBYTE, now called the COMPUTER CENTER at 31 East 31 Street in N.Y.C. I remember the first time I attended a meeting — nervous, anxious and shy. (Do you believe that? Me neither.) I found the people very friendly, helpful and sympathetic, especially after I told them I had a TRS-80 computer.

From there I was informed of the existence of the TRS-80 USERS GROUP that met every fourth Tuesday of the month at one of the member's

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BEGINNER'S CORNER
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place of business. I was also informed of another group that met in the city for informal reviews and lectures, as well as conversation about the latest software and hardware. As it turns out, some of the members are professionals in the computing business. The name of the group is the Metro TRS-80 users group. There is also a group that meets in Brooklyn, called Kingsbyte, that does something similar to the Metro group (many are the same people). One meeting at Kingsbyte that I heard about included a demo of the LNW machines and some hard disk technology. As you can see, one thing can and often does lead to another (not to mention information no sales person will reveal).

Another important SOURCE of information that would certainly (compu) SERVE as a means towards these ends would be the local bulletin boards. I try to keep up with an up-to-date listing of those around, but you must understand that the situation of whom to call and what numbers are valid is a difficult and frustrating dilemma, because people are always changing their phone numbers. I recommend you subscribe to LOG/ON magazine 1405 Krameria St. office 3-C, Denver Colo. 80220 for further information (also, see my articles in the June and July issues of Com*putronics).*

I have found that some of the most reliable information about whom to contact and when the next meetings were to be held (or not held) was on one or more of the most popular bulletin systems, whether professional or non-professional (as opposed to unprofessional). The purpose of these systems is to help you, and as a clearing house for local clubs, they're terrific. I think that that is by far the best service they provide.

Let's review what we have so far. One of the best methods to find a club is to go to your local dealer. They often support groups, and they certainly prefer to have their business than to see it go elsewhere. I have found that even some merchants or their employees belong to clubs. The second alternative is local BBS's, which are always good for the latest on meetings.

A third "fair" direction, but by far not the best, is your local YELLOW PAGES. Believe it or not, they have a section called clubs and/or organizations. You might get lucky and find one listed that would lead you to another, etc. NYACC I believe is listed in the Manhattan Yellow Pages, or were at least trying to get listed (there's always a reason for a foul up).

After you have exhausted these alternatives, it's time for the heavies. If after all this you still can't find a local group, then I suggest two things: (1) get yourself a copy of BYTE magazine and/or a copy of *Infoworld.* These two publications often contain a section that lists various clubs looking to get new subscribers to their newsletters. Often these newsletters can help you find other people in your area searching for the same opportunities.

This leads to my second alternative: my suggestion (hold on to your hat for this one) is to start your own club, by reversing the order of how you might find one. Try to get a local dealer to let you use his facilities for meetings or to spread the news of your existence. If you get enough response, try to get listed with the phone company, etc. Let those of us at Com*putronics* know what you're trying to do. I'm sure we can help by letting others know about you.

OK. Now we get to WHY you should join the clubs.

Besides the obvious "misery loves company" complex, you will find that belonging to a club is an educational as well as a socially uplifting experience. At a TRS-80 users' meeting that I attended recently, I met an MD, a Lawyer (sort of an assistant D.A. type), a computer business dealer/owner (WHY WAS HE HERE, I WONDERED!), and assorted people who have trouble winning at Pac Man.

As it turned out, the Lawyer was a novice. I believe he hadn't had his system for longer than a few weeks. He said he was having trouble converting a word processing program for the MOD I to work on the MOD III. Not a bad project for a fledgling. Not bad, just terrible. I don't think I know three people who could accomplish that kind of task!

He was also having trouble writing some disk files. I forget the reason why. He told us how he'd been up to all hours of the morning (from the previous night) trying to accomplish his tasks. Well, after he'd put up with a little ribbing, we solved his various problems (he found a few more questions to ask), and remarked later that he'd learned more in three minutes at the club than he had for the past several weeks trying to read the TRSDOS manual and several other meandering micro milieu (excuuuse me!).

Aside from this kind of comradeship, some clubs have guest speakers and company reps to lecture about various topics. At a meeting in Manhattan (Metro club), I had the pleasure of listening to a review and discussion on the R.S. Cobol package. I realize that it doesn't sound especially interesting, but let me assure you that it was. The speaker was (is?) a professional and taught at the MERRILL SCHOOL, which is an establishment that teaches people how to program in several languages for a "reasonable" fee.

What I learned was that the R/S Cobol is a very professional package that is standard. This fact is important, because it means that a TRS-80 user could go home and work on a business package that would work equally as well on an IBM/370 or some other mainframe computer. This demonstrates that micros are fast becoming the means for the once snobbish mainframe elite to get work done efficiently and cheaply. Perhaps *cheaply* should be underlined, because the power of the micro is definitely in the money it saves big and little businesses.

As reviews go, it was one of the more interesting lectures I've had the pleasure to attend, and I intend to go to quite a few more. Some of the other benefits to going to a club is often in the financial realm. When I have to purchase diskettes, I've found that there is money to be saved when buying in large quantities. Where else will you find enough people to get a deal on 1000 or more diskettes? I've bought some of the best for as little as $19.00. When I

see the price in the stores at $40.00 or more, I begin to lose my appetite for the week.

Other benefits are in the area of cheaper equipment. I'll let you know the price of getting a printer (I'm saving my money for it) through the club when the time comes. I'm positive it will be better than any advertisements I've seen. Besides better prices on hardware and materials, I've found that getting repairs can be easier and less expensive as well. We have a member who fixed drives as a sideline. I say FIXED as a sideline because he has since gone into a partnership with a business called STONEY CLOVE in Greenwich village N.Y. C. These days as I'm so often having trouble with my Model I that I need all the help I can get. It seems that I've stumped the professionals at Radio Shack.

When using Electric Pencil on the Model I, I get the worst keyboard bounce I've ever seen. Every time I hit the space bar, the cursor leaps about ten spaces. I've just found out that there may be a relationship between the curious cursor creep and the fact that I like to play games a great deal. It seems that I might be jarring loose some of the connections and solder joints in the spacebar below the keyboard. If I was to clear the connections and perhaps reinforce them better I might eliminate some of the problem. (That's assuming that that is the only source of the problem.) Another alternative is to get GOLD PLUGS as well to insure connections between the CPU and the Expansion Interface boards.

Well, that about raps up the good reasons for joining a club that may not be obvious to you. I hope I've inspired you to give it a try. If by chance you can't find a club in your area and decide to start one, then by all means drop me a line, and I'll be glad to mention it. Remember, with computers as a hobby and all the nifty things you can get to feed the beast by means of trading or group purchasing, then every day can be a holiday. So, from now until next year, have a good holiday.

Spencer Koenig
153-27 73 Avenue
Flushing NY 11367 ■

ARRAY OF HOPE FOR BASIC PROGRAMMERS (PART 5)

Arne Rohde

6. Sorting it out

There are a large number of methods available for sorting an array into a particular sequence. Each method has advantages and disadvantages, and the sorting speed is dependent on the size of the array to be sorted, the previous sequence of the array, the memory size and type available for work areas and code, and the language used for implementing it. There is a large amount of literature available describing the various methods and how they can be implemented, but much of it is directed towards students of computer science and not to programmers working in Basic on a personal or other microcomputer. This may be the reason why articles occasionally appear in computer magazines describing "new" sorting methods which have been known for many years. Very few completely new sorting methods have been discovered within the last 5 or 10 years, although some of the older methods have been improved or refined.

It is the purpose of this article to describe some of the more common sorting methods, and to present some Basic routines which can be used to implement them. Timing comparisons will also be given for various array sizes and types, and various sequences of the elements in the array. Recommendations will also be given on the suitability of each sorting method.

6.1 Sorting during Insertion

There are two main methods of sorting an array. If the array is to be kept in a certain sequence at all times, and insertions can be made in the array, then the array must be sorted after each insertion. This can be done by sorting during the insertion, so the array will be in sequence when the new element has been inserted. The other method is to sort a complete array once all the elements are present in the array. We shall first look at some of the methods available for sorting during insertion.

6.1.1 Unlinked Arrays

Inserting elements into an unlinked sequential array is a relatively slow method of sorting, but there are a number of reasons why it is widely practiced. The first is, as mentioned earlier, that the array will be in sequence at all times, and can thus be used for non-linear searching methods such as the binary search. This would be an advantage if the number of searches is larger than the number of insertions. The second reason is that the array may not be very large, and the number of insertions limited, thus reducing the inconvenience of a slow insertion. The insertion method is also fast if the elements are almost in key sequence when they are inserted, rather than in random sequence. The difference in speed can be more than an order of magnitude.

The position in an array where the new element is to be inserted can be found while the necessary elements are moved to make room for the new one. This eliminates the need for a separate search to find the position, although this search may be necessary to determine whether a particular value is to be inserted.

If we again assume an array A containing AE elements, and with a maximum subscript value of AM, we can insert a new value AN into the array. A check will be made for array overflow, and the elements will be assumed to be in ascending key sequence from subscript 0 to AE-1. The code to insert the element can be as follows:

```
100 I = AE - 1:
    IF I >= AM THEN PRINT "Array A overflow": STOP
110 IF I >= 0:
        IF AN < A(I) THEN A (I+1) = A (I):
            I = I - 1:
            GOTO 110
120 A (I+1) = AN:
    AE = AE + 1
```

Note again that the main search and move loop is kept as a single line (line 110) to speed processing. The elements are moved one at a time until the start of the array is found, or an element with a lower or equal key value is found. If duplicate key values do exist then the elements with the same key value will appear in the sequence in which they are inserted.

In a timing test with an integer array A, a new key value AN was to be inserted. In the first test the value AN arrived in completely random order, in the second test the values were almost in sequence, with every 6th value on average being out of sequence. The final possibility of the keys being in almost descending sequence on arrival was not tested, since this would result in even worse timings than for random keys. If this sequence were usual then the array should probably be stored in descending key sequence instead of ascending sequence.

The timing runs gave the following approximate results (in seconds):

Array elements	Random sequence	Almost in sequence
20	3.5	
50	17.0	3.6
100	63.4	7.2
250	409.0	17.6
500	1567.0	34.4

It can be seen that the times for random keys increase at a faster rate than the number of elements, and that the time to insert a single element in a 500 element array averages more than 5 seconds. The times for keys almost in sequence increases approximately linearly for all array sizes, but this is due to the fact that the keys which were out of sequence were to be inserted near the end of the array. If these keys had been more random then the times would also have been longer for large arrays.

For processors or languages which support a block move the method can be speeded up by first finding the position for the new element with a binary search, and then moving the remainder of the array in a single move to make room for the new element. This is not possible in Basic, but with

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some of the subroutine packages available on the market it should be possible.

6.1.2 Linked Lists

A linked list has the advantage that none of the array elemens have to be moved in order to insert a new element. This would especially be an advantage for multi dimensional arrays or for string arrays where the string reorganization time can be prohibitive. The disadvantage is, of course, that linked lists must be searched sequentially, and it is therefore not possible to use a fast search to find the position for insertion. However, some of the methods discussed under searching could be used to reduce the search times, especially if something was known about the key sequence of the new arrivals.

The method for the linked list consists of first finding the required position in the array, and then changing the pointer in the previous element to point to the new element, and moving the pointer from the previous element to the new one. Special care must also be taken if the new key value is lower than any value present in the array. In this case the pointer to the first element must be changed. To simplify the logic, a work item is used to store a pointer to the last element which was examined.

The array is again defined as A(AM), and a corresponding link array defined as L(AM). The variable LF points to the first element in the list, and is initialized to -1 to indicate an empty array. I is used as the index, and IP stores the previous index. The array contains AE elements, and the new element has key value AN: The code for the insertion can be as follows:

```
1Ø LF=-1: REM Initialize link pointer
...
1ØØ IP = -1: I = LF: REM Initialize indexes
11Ø IF AE > AM
       PRINT "Array A overflow": STOP
12Ø IF I >= Ø:
       IF AN >= A(I) THEN IP = I: I = L(I): GOTO 12Ø
13Ø A (AE) = AN: L (AE) = I
14Ø IF IP < Ø THEN LF = AE
   ELSE L (IP) = AE
15Ø AE = AE + 1
```

The main loop again consists of a single line, line 120. The links in array L are used to find the position for the insertion, and the loop continues until a negative pointer is found, or until a higher key value is found. If the sequnce of duplicate key elements is of no significance the comparison in the second line of line 120 can be changed to IF AN > A(I) so that identical keys are not bypassed before insertion.

In this case only a single direction link is used, to follow the elements in ascending key sequence. Also no consideration is taken for any previous sequence in the keys. The timings are also influenced by the single dimension integer array A, and compared to the unlinked arrays the times would have been better if array A was a string array. The following times (in seconds) were recorded:

[See top of next column]

Array size	Random keys	Keys almost in sequence
2Ø	3.5	
5Ø	17.2	3Ø
1ØØ	59.4	114
25Ø	356.Ø	69Ø
5ØØ	1432.Ø	2695

It is obvious that for this method it is a disadvantage to have the keys almost in sequence. This is due to the search having to start from the beginning of the array each time, and when the keys are almost in sequence every array element will have to be examined. The extension required to cater for keys which are almost in sequence is simple to add to the above code. Since the last key inserted will be the one at the end of the array, AE - 1 will point to the previous insertion. If the previous pointer IP has not been altered between insertions it will also have the correct value for the current insertion. The following code could be used:

```
1Ø LF = -1: IP = -1
...
1ØØ IF AE > Ø:
       IF A (AE-1) <= AN THEN I = AE - 1: GOTO 12Ø
11Ø I = LF: IP = -1
12Ø IF AE > AM PRINT "ARRAY OVERFLOW": STOP
13Ø IF I >= Ø:
       IF AN >= A(I) THEN IP = I: I = L(I): GOTO 13Ø
14Ø A(AE) = AN: L(AE) = I
15Ø IF IP < Ø THEN LF = AE ELSE L(IP) = AE
16Ø AE = AE + 1
```

The new addition to the code checks for the value previously added to the array (line 100). If the new value is higher or equal, then the search continues from the previous point, otherwise the pointers are reset to point to the beginning of the array (line 110). These are the only additions or changes to the original code. With these changes, and with the same data almost in sequence the times for the various array sizes were as follows:

Array size	Old code	New code
5Ø	3Ø	1Ø
1ØØ	114	35
25Ø	69Ø	161
5ØØ	2695	632

The possible savings are largest as the array size increases, but even with relatively small arrays the possible savings are significant, and can be achieved with only a small increase in complexity of code.

If elements in the array can be deleted the code will not be quite as simple as above, since new elements may not always be inserted at the end of the array. There must be some method for finding the free array elements, and the new value is then inserted in a free position. One possible method, similar to that practiced by Microsoft Basic for string storage, is to leave the deleted items in place until space for new items runs out. The array is then reorganized so that all elements in use are moved to one end of the array, and all the free elements are left at the other end. Those who have worked with large string areas in Basic programs will realize the disadvantage of this method. Another possibility is to have a linked list for the free

RETIREE ENTHUSIASTICALLY "BYTES" INTO THE WORLD OF PERSONAL COMPUTERY

Michael Herbert Shadick

Stewart Buckingham of Anaheim, California rather lovingly refers to his personal computer as "my TRS-82". Does he, then, have a specially-modified TRS-80, or what?

"Actually," Stew explains with a grin, "It's more like the other way around. My computing has modified *me!*" Which is a rather remarkable statement, coming from someone whose modifying days are over, some might say.

For Stew, you see, has been around as long as this century.

Born in 1899, this native Californian (a rare enough species, these days), is also one of computerdom's newest converts.

"I've had my TRS for only a couple of months," Stew points out with justifiable pride, "and already I'm up to my disk drives in programs, more than one of which I've written myself."

A most amazing accomplishment? Not to hear Stew himself tell of it! "I borrowed all the BASIC programming literature I could get my hands on from the library," he recalls, "and now I'm teaching myself the rudiments of PASCAL."

Stewart is not at all unmindful of his "senior" status, and has in fact developed several BASIC programs to help his fellow octagenarians and others. One of the programs, called SENFIN, is a financial management software package designed especially to meet the needs of Stew and his peers. "We seniors have special financial needs and situations," he explains. "So we worked up a program which takes all our special variables into account, so to speak."

Though Stew has no plans to market SENFIN as such, he is willing to "work something out" with any interested parties.

Yet another area of home computery which fairly fascinates Stew is—can you guess?—video games! As you might surmise, he has designed and programmed a couple of his own, including a "Monopoly"-like game where people "roll" their way around, not on a board but through life! "You begin the game by being born," Stew explains. "And—well, you take it from there!" Perhaps, needless to say, this particular video game has its share of surprise endings!

Not at all incidentally, Stew has managed to get quite a number of his fellow seniors interested in home computery in general, and in TRS-80 operation and programming in particular. "It's not that difficult," he admits. "I mean, the sort of logic which is required for BASIC programming, is something which comes rather naturally, really, to those of us from the old school. Once we get over the culture-shock or amazement or whatever you wish to call it, of just how much a computer can do for you at the touch of a couple of keys, why, the rest is almost child's play."

Those of younger generations sometimes see people of Stew's vintage as being—well, "over the hill." And Stew is the first to agree! "Y'know," he likes to philosophize, "a lot of life is spent in climbing, struggling, striving to get to the top of the heap, wherever *that* is. Well, when you've *reached* the top, or at least *feel* that you have, then the rest of life is really all down sailing. And I wouldn't switch sides for the world!"

What, you might well be wondering, did Stewart Buckingham do for a living, prior to his retirement and his subsequent micro-discoveries? He was—and is—a furniture refinisher and restorer. "I love working with my hands," he observes. "I guess maybe that's one of the reasons why I got into TRS computing, really. I can see my own handiwork, and appreciate it—and so can others, especially fellow computer nuts. There's more of us around than I ever *dreamed*. And some of them have even had me refinish some of their treasured old wood antiques."

Which is about the *only* thing which Stew has yet to devise a program to help him do. "But I'm working on it," he claims. And indeed, once having met the man and observed what he and his TRS-80 (excuse me, his TRS-*82!*) are already accomplishing, one is likely to believe that this senior partnership could accomplish most *anything!*

Michael Herbert Shadick
1515 South Fourth Street
Minneapolis, Minnesota 55454 ■

ALPHA PROGRAM

G. A. Concha

The calculation of equilibrium concentration of all ionic species, in aqueous media, for any weak polyprotic acid is a complex problem. A series of algebraic equations must be solved in each case.

The chemical importance of this determination is its wide applicability — thus, for example, when a chemistry student calculates the equilibrium concentration of the weak polyprotic acid and its anions, in order to visualize the predominant species, at a given pH. This information is also useful in chemical industry production processes, such as purification of reagents.

The program requires the following input data: the number of replaceable hydrogens, the acidity constant values in decreasing order. The screen displays the pH values and the numerical values of each of the ionic species. The pH increases in 0.1 pH units in the range of pH values from 0 to 14.

The program is written in Radio Shack TRS-80 Level II BASIC and will run on a 16K machine without disks. It is possible to modify the range and the increments of pH in the program as required by the users.

program continued on page 59

elements as well as the used ones. The same link array can be used, but a pointer to the first one must be established, and the link array must be preformatted to include all elements in the array before it is used for insertions.

6.1.3 Binary Trees

A binary tree is merely a form of linked list, and like the linked list in the previous example the insertion of a new key consists in finding the position where it is to be inserted and merely changing a few pointers. There are enough special considerations, however, to make the code completely different and also slightly more complicated.

For the purpose of this example we shall assume that duplicate keys cannot occur. These could obviously be accomodated, but for many practical cases where binary trees are useful they will not occur. For example duplicate customer numbers or employee numbers would not normally be used.

We have already seen the code which can be used to find an element in a binary tree, and similar code will be used here to find the position for the new element. When the position is found, the appropriate pointers must be changed. A new element will always be inserted as a leaf node, but can be in either a left branch or a right branch.

The worst case of a binary tree is simply a linear linked list, and this case will occur if all new keys appear in sequence. They will all be added to the rightmost leaf for ascending sequence, or the leftmost leaf for descending sequence. If this occurs then the tree should be reorganized at intervals so that it becomes more balanced. The code for performing this will not be given, but for large binary trees where the search time becomes excessive the possibility of a reorganization should probably be considered. If necessary the reorganization could be done as part of the insertion process.

The tree we will use here will have negative pointers to the next element for all the leaf nodes. This pointer will also have to be updated. If we start with a empty tree and wish to build the tree which was used to illustrate the sequential search, the keys will appear in the sequence 3, 5, 1, 6, 2, 7, 4. For the first key the root pointer will contain the value zero. This is changed to point to element 1, and both pointers are set to zero to indicate no left or right branch. The tree becomes

```
1   3  Ø  Ø
```

with ROOT = 1. The next key 5 is higher than 3, and should thus be present in the right hand branch. Since this branch is empty, the key is inserted at element 2, the right pointer is taken from element 1, and the right pointer in element 1 is set to point to element 2. The left pointer in the new leaf node is set to zero, since it has no left branch. The tree now becomes

```
1   3  Ø  2
           2   5  Ø  Ø
```

The next key to be inserted has value 1, and should thus be present in the root node's left branch. Since this branch is empty, the left pointer in the root node is changed to point to the new element (number 3), and the previous left pointer from the root node moved to the new leaf node. The right pointer in the new node must then point to the root node, but with a negative value. We now have the following tree:

```
          1   3  3  2
3   1  Ø  -1          2   5  Ø  Ø
```

The next new key is 6, which is to be inserted as a right node to the node with key value 5. Again the new node takes the right pointer from the owner node, the left node is set to zero, and the right pointer of the owner node will point to the new leaf. The tree then becomes:

```
          1   3  3  2
3   1  Ø  -1       2   5  Ø  4
                              4   6  Ø  Ø
```

The general algorithm should now be apparent. If the new leaf is inserted as a left node then the left pointer in the new node is set to zero, the right pointer will point with a negative value to the owner node, and the left pointer in the owner node is set to point to the new leaf. If the new leaf is inserted as a right node then the right pointer of the new node is set to the right pointer of the owner node, the left pointer is set to zero, and the right pointer of the owner node is set to point to the new node. If the new node is the root node then both pointers in the new node are set to zero, and the root pointer set to point to the new node.

It should now be possible to write the code for inserting new nodes in a binary tree. As for the sequential arrays, a counter of the number of elements in the array, AE, will be used for inserting the new element and checking for overflow. Unlike the previous arrays element zero will not be used, and the root pointer will be maintained to allow for deletions in which case the root node will not always be element one. The code for the insertion could be as follows:

```
100 IF AE >= AM THEN PRINT "Array A overflow": GOTO 200
110 AE = AE + 1: A (AE, KEY) = AN: A (AE, LEFT) = Ø:
    A (AE, RIGHT) = Ø: REM prepare new item
120 NXT = ROOT: IF NXT <= Ø THEN ROOT = AE: GOTO 160
130 IF AN > A (NXT, KEY):
        IF A (NXT, RIGHT) > Ø THEN NXT = A (NXT, RIGHT):
            GOTO 130
        ELSE A (AE, RIGHT) = A (NXT, RIGHT):
            A (NXT, RIGHT) = AE:
            GOTO 160
140 IF AN < A (NXT, KEY):
        IF A (NXT, LEFT) > Ø THEN NXT = A (NXT, LEFT):
            GOTO 130
        ELSE A (AE, RIGHT) = -NXT: A (NXT, LEFT) = AE:
            GOTO 160
150 PRINT "Duplicate key"; AN; "not inserted":
    AE = AE - 1: REM restore number of elements
160 etc.
```

The main loop of this algorithm is found in lines 130 and 140. The left or right path is followed until the correct position for the new element is found. Note that the new element is actually inserted in line 110 before the position is found, and before it is determined if the key is a duplicate. Thus the array overflow message may appear

even if the new element is not to be inserted.

This problem, if it becomes a problem, can be avoided in a number of ways. One possibility is to make a search before the insertion to avoid duplicates here. Another would be to store the previous element in the path taken to reach the required position, together with an indication whether it was a left branch or a right branch. The insertion portion can then be combined for the various cases when the search terminates.

Times were recorded for different array sizes, and for keys appearing in random sequence, and for keys appearing almost in sequence. The method for generating these keys was the same as for unlinked and linked sequential lists. The times, in seconds, were as follows:

Array size	Random keys	Keys almost in sequence
20	5.5	7.6
50	14.1	41.8
100	37.0	177.0
250	96.0	
500	216.0	

It can be seen that the increase in time for random keys is almost linearly proportional to the array size, but for the keys almost in sequence the times increase much more rapidly than the array size. The times in this case are even higher than for the linear linked list, presumably because of the greater complexity in the main search loop.

6.1.4 Hash Code Arrays

Arrays with key values stored by hash code calculations will normally not be in sequence, except for the special case of the direct reference where the key itself is also the hash code. If hash code arrays are to be referenced in key sequence without disturbing the storage sequence of the array elements then a very slow array search technique will be necessary. This is perhaps acceptable if the sequential reference is only performed very rarely compared to the number of random references. The method given later for referencing arrays in key sequence can also be used for other arrays where they are to be referenced in another sequence than the storage sequence.

Insertion of elements in a hash code array is relatively simple, except for the handling of overflow elements. If we use a link to connect the primary element in the main array area with any elements with the same key value in the overflow area, then the search sequence can be simplified. As soon as a link with a negative value is encountered the loop has terminated.

As usual AM will be the maximum index value we can use for the array, and AO will now be the next available subscript value for the overflow area. Any overflow element will be inserted in the element pointed to by A(AO). Before insertion the array will be checked to see whether the element already exists. In this case it will not be inserted. The calculated hash code will be assumed to be present in the variable HC. The code can be as follows:

```
100 IL = HC
110 IF A(IL, KEY) < 0 THEN 170: REM Room in main area
120 IF A(IL, KEY) = AN THEN 180: REM Found in array
```

continued on page 36

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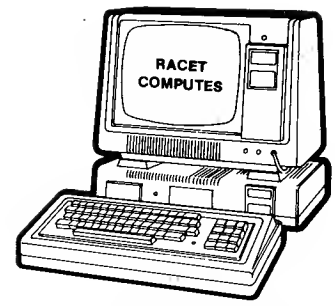

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ASSEMBLY LANGUAGE FOR BEGINNERS (PART 11)

Joseph Rosenman

This Month: Random Screens

So what is a random screen? I will present two programs that generate different kinds of random screens. The first program will create a screen full of one particular graphic character. This screen will delay for a random period of time. Then, a new random screen will be generated, and so on.

```
;
; Random screen generation program # 1
;
        ORG     7000H   ;Address of program beginning.
VIDEO   EQU     3C00H   ;Start of Video RAM.
RAND1   LD      A,R     ;Get a random number.
        OR      80H     ;Number must be at least 80.
        CP      0C0H    ;Upper test value.
        JP      P,RAND1 ;If greater, start again.
        LD      HL,VIDEO
        LD      DE,VIDEO+1
        LD      BC,1024
        LD      (HL),A  ;First character=new graphic.
        LDIR            ;Fill screen.
;
; Delay for a while.
;
        LD      A,R     ;Get a random number.
        LD      H,A     ;Save it in H (as MSB).
        LD      A,R     ;Get a second random number.
        LD      L,A     ;Save it in L (as LSB).
DELAY   DEC     HL      ;One less count.
        LD      A,H     ;Get MSB of count value.
        OR      L       ;Sneaky test to see if it's zero.
        JR      NZ,DELAY ;If not, repeat.
        JP      RAND1   ;If it is, start again from the top.
        END     RAND1

7000  ED 5F F6 80 FE C0 F2 00 70 21 00 3C 11 01 3C 01
7010  00 04 77 ED B0 ED 5F 67 ED 5F 6F 2B 7C B7 20 FB
7020  C3 00 70 .. .. .. .. .. .. .. .. .. .. .. .. ..
```

Actually, there isn't anything here that is really different. The statement "JP P,RAND" might be slightly confusing at first. This means, "if the SIGN flag is set to positive, jump; otherwise, continue". How did the SIGN flag get set? The statement "CP 0C0H" preceding the JP set the flags. What happened when the CP was executed? The argument of the CP (80H) was subtracted from the A register, and the flags were set according to the results. The contents of the A register were NOT changed by the CP operation.

As I mentioned in the last issue, the R register is generally used to Refresh dynamic RAM. It can also be used as a Random number source. This program first forces the high bit to 1 (by the OR 80H statement). Why? Two reasons. First, the video graphic characters on the TRS-80 are the byte values 80H-BFFH. Now as I'm sure you all remember from the days that you were rank beginners, 80H is 1000 0000 in binary. This statement makes sure that the random number is at least 80H (the first graphic character). Normally, I would have simply tested the value and if it were less the 80H, I would have gotten another one. I quickly discovered a problem as I tested the program: nothing happened! (The computer seemed to freeze.) I discovered that the R register never seems to contain a number greater then 7FH. How do I know this? First, using the Monitor 5 program available from Howe Software, I repeatedly stepped through the program. Each time a new random number was loaded (from the R register), I noticed that it was always less then 80H. Then, to prove this anomaly, I wrote a short test program that got and displayed values from the R register as quickly as possible. I quickly learned that 7FH seemed to be the limit. Why? I have no idea. If I find out, I'll let you know. For this reason, rather then testing for 80H or greater, I forced the value to a number in the range of 80H to FFH.

How do you exit this program? By reseting the computer. For certain users, there is a second way. If you have a disk system AND are using Apparat's NEWDOS80, and you have the Keyboard and "DFG" functions enabled, then you can interrupt the program by simultaneously typing "DFG" — causing you to enter MINI-DOS. You can continue by typing MDRET, or stop and return to DOS by typing MDBORT.

What about this other Random program? This program will step through the screen (last to first, 3FFFH to 3C00H). Then, it will randomly select a graphic character, and display it at that location. After all of this, it will start again. Prior to the start of program (for the first time), it will clear the screen.

```
;
; Random screen display program # 2.
;
        ORG     7000H
VIDEO   EQU     3C00H
RAND2   CALL    01C9H   ;Special ROM routine to clear screen.
        LD      DE,VIDEO ;Address of start of screen.
        LD      BC,1023 ;Size of the screen.
LOOP    CALL    DISP    ;Display a random graphic.
        DEC     BC      ;Point to next location.
        LD      A,B     ;Get MSB of location.
        OR      C       ;Test for zero.
        JR      NZ,LOOP ;If not zero, do next.
        LD      BC,1023 ;If zero, wrap around.
        JR      LOOP    ;Continue with program.
;
DISP    LD      A,R     ;Get a random number.
        OR      80H     ;Force high bit on.
        CP      0C0H    ;Check upper limit.
        JP      P,DISP  ;If limit exceeded, get another.
        LD      H,D     ;Valid. Get video address
        LD      L,E     ;into HL from DE.
```

continued on page 33

PRACTICAL BUSINESS PROGRAMS

Steven M. Zimmerman, Ph.D. and Leo M. Conrad

This Month: Month # 1: General Ledger Menu

This the first in a series of eight articles devoted to presenting a general ledger system. This month we will start by describing the overall structure of the program set, the objective of the set, and the menu program from which all other parts of the system are called.

The accounting system which will be described through this series of articles is designed to operate a small business. It has been used to operate a book store, a car wash, a consulting business, and a real estate management operation. The system has performed all the accounting tasks required of it with ease.

The system is designed to be used by a trained bookkeeper or accountant who knows what debits and credits are. The input of data follows standard double entry bookkeeping practice, in a manner which allows for efficient input of data. The format of the balance sheet and income and expense statements are simple, but they may be readily expanded for any specific need. One cash account is maintained for the purpose of check book reconciliation. In addition, the system is designed to be run monthly with year to date information being maintained for managerial decision making.

The establishment of a computerized accounting system will force some changes in how your business is run. You must initially spend some time with your accountant to organize and structure the accounting system. Once it is set up you will have to spend some time in training yourself and your employees to use the system correctly. Finally, when the system is up and running, you will be able to concentrate on what the numbers mean rather than the mechanics of doing the bookkeeping. This is the primary objective of an accounting system.

The ability to generate timely and accurate up to the minute reports on your financial condition at any given moment can mean money in your pocket, by allowing you to make better business decisions. If you are interested in more money in your pocket, and who isn't, then computerized accounting is a must for you.

The system is designed to operate on a Radio Shack Model I or Model III with two disk drives and a minimum of 32k of memory. Any eighty column printer will be able to handle the output of this accounting system.

The capacity of the system varies with the different programs in the set, the amount of internal memory available on your machine, and the combination of the size of:the chart of accounts versus the number of periodic transactions. The largest business we have operated with the program on our 48k Model I, and has approximatly 70 items in its chart of accounts and requires about 200 transactions per period.

GLMENU is used to call the other programs. We will start by reviewing how to use GLMENU. Each of the following will be devoted to reviewing the operation of one or more of the programs which are part of the accounting system.

As we review how to use the GLMENU program we will also detail what the programs in the menu do.

RUNNING GLMENU

The following information will appear on the CRT in front of you after GLMENU has been loaded and starts to run.

```
GLMENU  GENERAL LEDGER MENU
        BA      BALANCE TO AID IN RECONCILIATION OF
                CHECK BOOK
         E      END
         C      CPA PRINTER OUTPUT OF P&L/BALANCE
                SHEET
         M      MOVE TO MOVE FILES TO NEW DISK
        MI      MILES TO CALCULATE AUTO COSTS
         N      NAME TO CHANGE/ADD NAME OF
                ORGANIZATION
         S      START  TO START NEW SYSTEM
         T      TRIAL FOR TRIAL BALANCE
        TR      TRANSACTIONS
         U      UPDATE TO UPDATE/CHANGE DELETE
                CHART OF ACCOUNTS
         Y      YEAR  INITIALIZES P&L YEAR TO DATE
                TO START YEAR
SELECTION?
```

The programs have been placed in alphabetic order. You select the program of your choice by typing in the code letter(s) and hitting the ENTER key.

The programs fall into four different groups. Group#1 is the start up routines. This group includes N for defining your company's name and S for establishing the initial chart of accounts for your system.

Group #2 is the operational program set. These programs will be used more than any other set. The key program in this package is TRANS or TR. This program records the transactions of your company. It is the general ledger of the manual system. CPA or C is the second program in this set, and is designed to produce a balance sheet and an income and expense statement.

The last program in the operational set is TRIAL, T. This program produces a trial balance. It has proven very useful on occasions when we sought to eliminate some strange and unusual error.

The third group of progams is the housekeeping set. These programs allow the updating of the chart of accounts, zeroing of the accounts at the beginnng of a year, and the moving of files from disk to disk. MOVE, M is the program designed to move files from disk to disk. For many of you it will be easier to use the built in moving functions of your

disk operating system. Some of you may find our program most useful.

UPDATE, U is designed to update and change the chart of accounts. All business is dynamic. The chart of accounts will have to be changed from time to time. This program makes it easy to do this task.

The last program in this set is YEAR, Y. This program should be used once a year to zero out the year to date information in the profit and loss statement.

There are two utility programs, BALANCE and MILES. The BALANCE, B program aids you in the task of balancing a check book.

The second program in this utility set is MILES, M. This program is designed to help you calaculate the mileage costs associated with using your car for business.

EXAMINING THE PROGRAM

The program is 26 statements long. The first 13 statements print the menu on the screen and allows you to make your selection. The remaining statements call in the program you have specified. In all cases the LOAD "XX",R instruction is used. This tells your computer to load and run the program specified. This means when you keypunch the program into your system you must use exactly the same names we have used. If you do not, the computer will not be able to find your program.

PUBLICATION SCHEDULE

In order to make use of the system you must have as a minimum, all the programs in Group #1; NAME, and START, and the following programs from Group#2; TRANSACTIONS, CPA. Next month we will present NAME and START followed by TRANSACTIONS and CPA in the next two installments. This will allow you to get started.

The next most important programs are Group#3; UPDATE and YEAR. These programs allow you to update the chart of accounts and to perform the year ending function of zeroing out the values in the income and expense statement. These will be published the following month.

The remaining programs will be published the last three months starting with the TRIAL balance program, followed by the check BALANCing program, and the MIleage and MOVE programs in the final month.

The publication schedule is as follows:

Order	Month	Program routine
1	.....	GLMENU
2	.....	NAME & START
3	.....	TRANSactins
4	.....	CPA
5	.....	UPDATE & YEAR
6	.....	TRIAL
7	.....	BALANCE
8	.....	MIles & MOVE

PROGRAM LISTING

```
1Ø CLS:PRINT "GLMENU  GENERAL LEDGER MENU":REM  "GLMENU"
2Ø PRINT "    BA     BALANCE TO AID IN RECONCILIATION OF CHECK
BOOK"
3Ø PRINT "     E     END"
```

continued on page 42

SOFTWARE REVIEWS

MONITOR #5 from HOWE SOFTWARE

Elliott Forman

There is a new version of the Howe Software Monitor program available, Monitor 5. This new version is a significant upgrade from the previous version, which was Monitor 4. Monitor 5 is being released for both the Model 1 and the Model 3 at the same time.

Monitor 5 includes a complete "HELP" directory of all the available commands. Instead of single letter commands, Monitor 5 uses two letter commands. While it is unfortunate that "single letter command code" compatibility could not be maintained with the earlier Monitor programs, this change was necessary to allow the greatly expanded selection of commands. In the table presented below, I have summarized the commands available in Monitor 5. Those commands marked with an asterisk have an equivalent in the Monitor 4 program.

Monitor 5 Commands

(1) Display Commands

```
DA  *  Display ASCII block from memory
DH  *  Display Hex block from memory
DI  *  Disassemble block from memory
DX     Decimal to Hex conversion
XD  *  Hex to Decimal conversion
```

(2) Move and Compare Commands

```
MB  *  Move Block in memory
VB  *  Verify a block in memory (against another block)
RP  *  Relocate program: move a block in memory, while adjusting
memory addresses for the new location.
UP  *  Unload program: move low RAM tape programs to RAM unused
by DOS, and add relocating code to the object module.
```

(3) Search Commands

```
FB  *  Find a byte in memory.
FS     Find a string (a multiple byte pattern) in memory.
FW  *  Find a word (two bytes) in memory.
```

(4) Jump and Exit Commands

```
JP  *  Jump to a specified address.
RD  *  Return to DOS (without re-booting).
RB  *  Return to BASIC.
```

(5) Cassette Commands

```
LC  *  Load (read) a file from the cassette.
WC  *  Write a file to the cassette.
```

(6) Disk Commands

```
IS  *  Read in a sector/multiple sectors from disk.
OS  *  Write a sector/multiple sectors to disk.
RF  *  Read a data file from disk.
WF  *  Write a data file to disk.
LP     Load object code (program) from disk.
WP  *  Write object code (a program) to disk.
KF  *  Kill a file on disk.
```

(7) Modify Memory Commands

```
EM  *  Edit memory.
TY  *  Type to memory (writes ASCII to memory instead of HEX).
IB  *  Initialize a block of memory to a specific value.
```

(8) RS-232C Commands

```
IR  *  Initialize RS-232C interface.
TM  *  Terminal mode.
TB  *  Transmit a block of memory out the RS-232C port.
RM  *  Receive a block into memory from the RS-232C port.
```

(9) Debugging Commands

```
DR     Display registers (and flags, disassemble current
instruction.
SR     Set register values.
SB     Set Breakpoint.
EX     Execute location. Execution halts when the breakpoint is
reached.
SS     Single step the next instruction(s). Registers are
displayed after each operation.
SC     Single step past CALLs. This command is similar to SS,
except that CALLs are executed before the next step.

HE     HELP! (Display the command summary).
```

Monitor 5 includes 10 new commands, including 7 debugging commands. The debugging commands in particular add to the power and versatility of this program. It is now possible to "dissect" your assembly language programs while they are executing. What happens is that Monitor 5 executes your programs, one or more instructions at a time, showing you the results as they occur. What is more, you can fix errors or experiment with different values while your program is in memory. With the disassemble and edit memory commands (to name two of the most useful), you can alter the machine code in RAM and execute it again. The Set register command allows you to alter values in the registers in the middle of your programs execution. All of this without having to edit and re-assemble the program. Of course, all corrections should ultimately be added to the source code.

In addition to a powerful "command vocabulary," Monitor 5 features flexible and helpful display features. Information being displayed can be "frozen," and/or advanced a single line at a time. If you want the display to be printed (assuming you have a printer connected to your TRS-80), just terminate the command with a down arrow instead of the ENTER key.

Personal Evaluation

However you look at it, the TRS-80 Models 1 and 3 are relatively small personal computers. Compared to the "professional" display of 24 lines by 80 characters, the TRS-80's 16 by 64 seems puny (of course, the Color Computer display is only 16 by 40). Why do I mention the

display size? Because you can only fit so much information on a screen. Whenever I thought about ways I might "improve" the Monitor 5 program, I realized that there simply was not enough room on the display to implement my "improvements." In fact, the procedures used in this program seemed to achieve the best balance between readability and "compact information." Clearly, a great deal of thought and effort went into the creation of this program. Monitor 5 has grown and improved in its evolution from Monitor 1. Furthermore, the quality of this package is underscored by its excellent documentation (33 pages). Finally, with the addition of the debugging routines, Monitor 5 has emerged as a comprehensive Monitor/Debugger package. Any serious "Assembly/Machine Language" level programmer MUST have two software tools on their computer: A good Monitor/Debugger and a good Disk Editor. I believe that Monitor 5 is one of the best Monitor/Debuggers that can be gotten for any TRS-80 system.

One final note: although many of the commands in Monitor 5 relate to a disk based system, Monitor 5 is fully compatible with a cassette based system, and with any RAM size (16K, 32K, or 48K). In fact, one of the first issues taken up in the documentation is how to relocate Monitor 5 to the most convenient address for your system. Why not "spruce up" your system for the new year with the entire "trio" of Howe Software packages: Monitor 5, Smart Terminal, and System Diagnostic (all reviewed in earlier issues of *Computronics*).

OK, where do you get it? Monitor 5 is available directly from:

Howe Software
14 Lexington Road
New City, NY 10956
for $59.95. Happy Debugging!

and

H&E Computronics Inc.
50 N. Pascack Road
Spring Valley, N.Y. 10977
Call toll free
800-431-2818

Elliott Forman
1810 Monaco Avenue
Elmont, NY 11003 ■

ASSEMBLY LANGUAGE FOR BEGINNERS

continued from page 28

```
        ADD     HL,BC   ;Add location offset to video.
        LD      (HL),A  ;Put graphic onto the screen.
        RET             ;All done.
;
        END     RAND2
```

```
7000  CD C9 01 11 00 3C 01 FF 03 CD 16 70 0B 78 B1 20
7010  F8 01 FF 03 18 F3 E0 5F F6 80 FE C0 F2 16 70 62
7020  6B 09 77 C9 . . . . . .
```

This program will continuously fill the screen with random graphic characters. Even though the program will change only one character at a time (from last to first, then last again), it will happen so fast that you won't be able to see anything but the entire screen shifting. If you want a project for the month, here is one: modify the program so that it will delay after the entire page has been displayed (either by a fixed value, or by a random value).

Why do I use a size of 1023? First of all, Video RAM is located at addresses 3C00H to 3FFFH. 3FFFH-3C00H=3FFH

continued on page 36

THE BT ENTERPRISES COMPUTER CONNECTION

New Toll Free Order Number [redacted]

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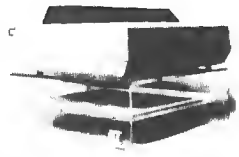

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ASSEMBLY LANGUAGE FOR BEGINNERS

continued from page 33

(1023). But it also can be proved another way. We all know that the screen is 64 characters across by 16 lines. 64*16=1024. Therefore, we know that there must be 1024 locations on the screen. Why 1023? Because zero is a valid location. Prove it? OK, consider this. The first video RAM location is 3C00H. 3C00H+0= 3C00H. 3C00H+1=3C01H, ..., 3C00H+3FFH=3FFFH (the last video ram location). This means that our offsets are the values 0 to 1023, a total of 1024 different values.

How might the program be changed if we want randomly to display standard ASCII? First of all, we would remove the OR 80H and the highest value test of 0C0H. Then we would know that all of the numbers would fall in the range of 0 to 7FH. Then, we would have to ensure that no numbers less then 20H get displayed (they are "special" characters and cannot be displayed in the normal sense). What if we want both standard ASCII and graphics? In that case, we would have a somewhat more difficult problem. We need to make several levels of decision in such a program.

(1) Get the Random character.
(2) ASCII or Graphic?
  (2) (a) ASCII — Make certain that it is < 20.
  (2) (b) Graphic — Force it to be > 80H (OR 80H). Make certain that it is < 0C0H.
(3) Display value.

How would you determine whether or not to make the character graphic or ASCII? The simplest way would be to alternate. If that is done, however, you will find that every odd position would be one way and every even position the other. Not very random! Instead, I would suggest getting a special random character just to determine the "mode." If the least significant bit is 0 display ASCII, if it is 1 display graphics. How would you make that test? Observe:

```
Label   Command Argument
        LD      A,R      ;Get random #.
        AND     1        ;Force every bit except 1st to Ø.
        JR      Z,MODE2  ;If zero, do mode 2 processing.
MODE1   whatever         ;Mode 1 processing.
        :
MODE 2  whatever         ;Mode 2 processing.

Remember, the AND 1 will cause:   ØØØØ ØØØ1

              (unknown value)     xxxx xxxx
Only first bit stays the same.    ØØØØ ØØØx
```

The AND causes the flags to be set according to the result. If the result is zero, then the last bit must have been a 0. If the result is non-zero, then the last bit must have been a 1.

Next month, we will start with our ersatz word analysis program.

Joseph Rosenman
35-91 161st Street
Flushing, New York 11358 ■

ARRAY OF HOPE FOR BASIC PROGRAMMERS

continued from page 25

```
13Ø IF A(IL, LINK) >= Ø THEN IL = A(IL, LINK):
       GOTO 12Ø
14Ø I = IL: IL = AO: AO = AO + 1
15Ø IF IL > AM THEN PRINT "Array overflow": STOP
16Ø A(I, LINK) = IL: REM Pointer in last item
17Ø A(IL, KEY) = AN: REM New key (+ data)
18Ø :REM Insertion end
```

If the main array area pointed to by the hash code is unused (has a negative key value) then only the key and data are to be inserted, and no pointers are to be changed. If the key value is already found in the array, then processing continues at line 180. Otherwise the link is followed until a negative link value is found. The new element is inserted, and the index is inserted as the link in the previous item with the same hash code. The link is updated in line 160 and the key and data in line 170.

The insertion algorithm was tested with random keys converted to a hash code by taking the remainder after dividing by a factor. The indexes higher than the divisor and to the end of the array were available for overflow elements. A link was maintained for keys with the same hash code. The time for inserting a number of elements was then measured. The results were as follows:

# of elems	Time in seconds	Divisor for hash code	# in ovflow
25	3.4	1Ø24	Ø
5Ø	5.6	1Ø24	Ø
1ØØ	9.9	1Ø24	4
25Ø	25.5	1Ø24	32
5ØØ	49.6	1Ø24	94
1ØØØ	111.9	1Ø24	337
1ØØØ	114.7	1Ø21	36Ø
1ØØØ	1Ø8.Ø	12ØØ	3Ø2
1ØØØ	1ØØ.8	15ØØ	224

In the last example the length of the chains were measured. Of the 224 elements in the overflow area 183 were pointed to by an element in the main storage area, 33 were the second chain in a link, and the remaining 8 were all positioned as the third element in a link. Thus a maximum of 3 overflow elements were examined to find whether a certain key value was present or not. Note that even with only about half the elements filled in the main area there were still 224 elements in the overflow area. This seems to indicate that a better hash code algorithm should be found, or a low utilization should be accepted for hash code arrays.

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LETTERS TO THE EDITOR

continued from page 10

my practice, along with my wife's (who is a psychiatric social worker) is booming, and we can't keep up with it all. (We can see the day when we will want to stop paying the accountant his high fees.)

Anyway, what I need that I can't get from the Radio Shack

people, because of their expectable vested interests, is some comparison shopping *Consumer Reports*-type articles on how to select components to get the Models I and III up to full capacity. I have tried to educate myself by reading all kinds of magazines such as *Computronics, Business Computing,* and *Byte,* and reading the ads and several introductory books to microcomputing, etc. What I need is advice on what disk drives to buy, alternatives to RS products such as their Expansion Interface, which by all accounts has problems. I am going to pick up a used Model III 16K for the heck of it and toy with that as well. I need many questions answered, such as: can I put together a system with non-RS disk drives (of what brand I don't know) run with NEWDOS, LDOS, etc., and which is better and how do I get my Model III or I to run CP/M? Is there a way to do that? How good are kits offered by MTI for Model I and III disk drives? Where is the floppy disk controller that runs the drives, and how do I get that in wherever it goes? Does somebody sell interfaces that will go on the Model I so I can avoid the RS one? Can I build one, and where can I find kits, etc.? Anyway, all this might give you or somebody up there in *Computronics* ideas to do a series of columns. There have to be a lot of idiots like me who need help and can't go in and hand around the stores for hours on end, and actually have practical needs in mind.

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We always appreciate receiving suggestions like this, and these are precisely the kinds of questions addressed in our Beginners' Corner. *In general, the most important thing we can suggest is that you continue to do exactly what you have been doing and read everything you can get your hands on. Even if you know a lot, this is still necessary, because the technology is changing very quickly and new products are coming on to the scene all the time.*

You can find out quite a bit about non-Radio Shack products by reading the advertisements and product reviews in magazines like this one. It is frequently the case that non-Radio Shack products are better than Radio Shack's, but the reverse is also true. The only way to find out is to read what other people have experienced.

As quick answers to some of your questions, almost any of the disk drive kits for the Model III will work, but we recommend those that use Tandon disk drives, because they are the ones used by Radio Shack and they are among the best products on the market. Memory expansion can be achieved by simply inserting the ICs, which cost as little as $2 each (you need 8 for each 16K). LNW Research Corp., 2620 Walnut, Tustin CA 92680 makes a high quality expansion interface for the Model I, but they have also brought out a completely redesigned computer. The PMC-80 from Personal Micro Computers, 475 Ellis St., Mountain View CA 94043 is another such alternative. Finally, we recommend that you avoid kits unless you really enjoy that kind of work, although we haven't considered it from a therapeutic viewpoint. ■

PROGRAM CONVERSION (PART 11)

Richard Kaplan

This month's cover demonstrates a procedure about which our technical support staff is questioned quite frequently: the process of directly transferring programs or data from one computer to another. There are many instances in which such a transfer can save a great deal of time in translating a program. Therefore, I will explain this month what is involved in transferring programs between computers such as the TRS-80 Models I, II, and III, the APPLE, the IBM PC, and CP/M-based computers. First, however, I would like to discuss a letter I received recently, as well as some facts pertaining to CP/M-based computers.

ABOUT HARD DISKS: A LETTER

A common cause of grief among microcomputer owners, particularly among users of pre-packaged software, is the compatibility of hard disk operating systems (or, more precisely, the *lack* of compatibility). The following letter (from Mr. M. Barlow, Supervising Engineer, Studio Systems Department, Engineering Headquarters, 7925 Cote St. Luc Road, Montreal, Quebec, H4W 1R5) illustrates the difficulties one may face in converting a program to run on a hard disk drive:

October 14, 1982

Dear Mr. Kaplan:

I have been reading your articles in Computronics *on Program Conversion with interest, and I would like to suggest a follow-up. I believe that a hard disk will be the device to have for any small business system in the future, but it may be that the programmer will do his development on floppies. There is therefore a need to know which systems are compatible in their handling of items likely to be affected by the use of a hard disk. To me these seem to be file types, and the need to squeeze large programs into small RAMs, e.g. dynamic MERGE and DELETE.*

We have been using NEWDOS/80 with a Corvus disk, but I note that many of the hard disk systems use DOSPLUS 4.0, and the Radio Shack disk seems to have LDOS. (After seeing some very unimpressive software from Galactic, I am a bit leery about LDOS). Neither of these can read NEWDOS IGEL-type files, nor can they handle dynamic merges or deletions; I am not aware that the dynamic string space alterations and multifield sorts of NEWDOS are supported either.

So my question is: if you were programming something to be used with a hard disk, and thinking in terms of upward compatibility with next year's computers, whose DOS would you use?

Yours sincerely,

M. Barlow

The subject of Mr. Barlow's letter is one which merits a bit of explanation. However, first I should state the answer to his primary question: I would use *DOSPLUS 3.4.*

A hard disk drive can store immense amounts of information — 20*million* characters or more — compared to a floppy drive, which can usually hold at best 500,000 characters. This capacity is a welcome luxury to computer owners whose businesses have outgrown the capacity of floppy drives. However, these same businessmen will often have nightmares when they actually attempt to implement their existing software on a hard disk drive. Many glitches can arise to frustrate inexperienced computer users.

Installing a hard disk drive requires using a completely new operating system tailored to that specific model of hardware. Because of the necessity of using a new operating system, incompatibilities arise.

The most common stumbling block in installing a hard disk system involves drive specifications. In most systems, the user's standard floppy drives are retained; hard drives are used *in addition to* floppy drives. Therefore, if the floppy drives are numbered 0 and 1, a hard disk would usually become drive 2. Therefore, programs must be altered to accommodate for data found on a different drive number.

The answer to Mr. Barlow's question was actually in his letter, when he wrote, "There is therefore a need to know which systems are compatible in their handling of items likely to be affected by the use of a hard disk. To me these seem to be file types, and the need to squeeze large programs into small RAMs...." In short, generally any type of file structure which is available solely on a specific operating system, such as NEWDOS/80, will function *only* on that operating system. It stands to reason, therefore, that installing a hard disk drive, which requires the use of a different operating system, will render this kind of function unusable. *[Editor's note: Apparat is currently developing NEWDOS/80 Version 3 for use with hard disks and other media.]*

In general, I would suggest using only standard random and sequential files if there is the possibility of expanding to a hard disk at a later time. (In addition, it is crucial to indicate drive specifications with a variable, i.e. OPEN "R",1,A$+":"+B$, to allow for easy relocation of data files.) Some hard disk operating systems may support specialized file structures, but you will not know until you actually purchase a hard disk drive.

Regarding the choice of an operating system, I would strongly recommend DOSPLUS 3.4. Although compatibility between floppy and hard disk operating systems can never be assured, DOSPLUS is the only floppy disk operating system I know of which is specifically designed for use with hard disk drives, allowing user configuration for such systems. Therefore, since switching to a hard disk drive which runs under DOSPLUS would require no switch of operating systems, all floppy programs will be completely compatible with the hard disk drive. Hence, my advice to Mr. Barlow would be to use DOSPLUS and to only use standard random and sequential files.

AUTOMATIC TRANSLATION TO MBASIC

I have recently completed the task of converting VERSALEDGER II to MBASIC 5.21 (also referred to as BASIC-80)

under CP/M. A major element of this conversion required no more than the insertion of spaces before and after every keyword (see issue # 46). Our technical staff realized that this task is a completely objective one — an ideal task for a BASIC program. Therefore, we developed a program which will *automatically* perform most work required to convert a Model II BASIC program running under TRSDOS to operate under CP/M's MBASIC (this program was created by David Staub, a member of the H & E Computronics Programming Staff).

```
5 REM **** CONVERSION PROGRAM: MODEL II BASIC TO MBASIC ****
7 REM **** COPYRIGHT 1982 BY H & E COMPUTRONICS, INC.
8 REM **** CREATED 10/82 BY DAVID STAUB, PROGRAMMING DEPT.
9 REM
10 PRINT CHR$(26)
20 L$="" : Q=1
30 OPEN "O",2, "OLDPROG.BAS"
40 OPEN "R",1, "NEWPROG.BAS",1
50 FIELD 1, 1 AS A$
60 I = 0
70 I = I + 1
80 GET 1,I
90 IF EOF(1)  THEN GOTO 130
100 L$=L$+A$
110 IF ASC(A$) = 13 THEN GOSUB 150 : GOSUB 450 : L$=""
120 GOTO 70
130 CLOSE :PRINT :PRINT "MISSION ACCOMPLISHED! -- NEXT TASK ?"
140 END
150 FOR K = 1 TO 27 : PRINT CHR$(26) : IF Q=0 THEN GOTO 420
160 READ W$ : R = LEN(W$)
170 I$=W$+" " :RE=0:CL=0:LO=0:SC=0:EA=0:GS=0:RM=0:DA=0
180 IF W$="RESTO RE" THEN I$="RESTORE " : RE=1
190 IF W$="THEN"  OR W$="OR"  OR W$="AND" THEN I$=" "+I$
200 IF W$="GOSUB" THEN GS=1
210 IF W$="@" THEN I$=" TAB("
220 IF W$="CLS" THEN I$="PRINT CHR$(CLS) " : CL=1
230 IF W$="OR" THEN LO=1
240 IF W$="AS" THEN SC=1
250 P=0
260 P =INSTR(P+1,L$,W$)
263 DA=INSTR(P+1,L$,"DATA")
265 RM=INSTR(P+1,L$,"'") : IF RM>0 OR DA>0  THEN Q=0
270  GOSUB 465
280 PRINT "SEARCHING FOR : " W$ "  IN : "
290 PRINT L$
300 IF QO=1 THEN PRINT "QUOTE SWITCH THROWN! -- NO CHANGE!"
    :GOTO 260
310 IF P=0 THEN PRINT "NOT FOUND IN THIS LINE!" : GOTO 420
320 IF W$="@" AND P>0 THEN EA=1
330 IF SC=1 AND MID$(L$,P,4)="ASC(" THEN PRINT "ASCII FUNCTION
    - NO CHANGE!" : GOTO 260
340 IF RE<>1 AND CL<>1 THEN IF MID$(L$,P+R,1)=" " THEN PRINT
    "NO CHANGE!" : GOTO 260
350 IF GS=1 AND MID$(L$,P-1,1)<> " " THEN I$=" "+I$
360 IF LO=1 THEN IF (MID$(L$,P-3,3)="ERR" OR MID$(L$,P-1,1)
    = "F") THEN I$=W$+" "
370 IF LEN(L$)+LEN(I$)>255 THEN PRINT "TOO LONG!": LPRINT
    "THIS LINE IS TOO LONG TO INSERT SPACES :" : LPRINT L$
    : GOSUB 450 : Q=0 : GOTO 420
```

```
380 L$=LEFT$(L$,P-1)+I$+MID$(L$,P+LEN(W$) ,LEN(L$)-P-LEN(W$)+1)
390 IF EA=1 THEN LPRINT "LINE CONTAINING -- @ --: " :  LPRINT L$
400 PRINT "NEW LINE:" L$
410 GOTO 260
420  NEXT K : RESTORE :Q=1
430 RETURN
440 DATA @, NEXT, IF, THEN, ELSE, TO, ON, LINE, OR, GOSUB,
    PRINT, AND, READ, RUN, LSET, GET, PUT, FIELD, OPEN, CLOSE,
    RETURN, AS, RESTO RE, CLS, CLEAR, DEF, DIM
450 PRINT #2, L$
460 RETURN
465 SQ=0:FQ=0 :QO=0:IF P=0 THEN QO=0 :RETURN
470 FQ=INSTR(SQ+1,L$,CHR$(34)):SQ=INSTR(FQ+1,L$,CHR$(34))
480 IF  FQ=0 THEN QO=0 :RETURN
485 IF SQ=0 AND FQ>0 THEN QO=1 :Q=0 :RETURN
490 IF P<FQ THEN QO=0: RETURN
500 IF P>FQ AND P<SQ THEN QO=1 : RETURN
530 GOTO 470
```

This automatic conversion program (see listing) will insert spaces wherever required in an MBASIC program (text in quotes and DATA statements are ignored). All that is necessary is to change the two lines at the beginning of the program to specify the input file (the name of the program to be converted) and the output file (the file into which to place the converted program).

Before running the program, it is necessary to transfer your Model II program to CP/M (see the rest of this article) and save it in ASCII format. In order to save a program in ASCII format, LOAD it in BASIC, then SAVE it with the syntax SAVE"XXX",A.

This program does not convert PRINT @, LOF, FIVE-LETTER variables, or OPEN statements (see issue # 46), as these conversion tasks cannot be defined in BASIC as easily as can the insertion of spaces. However, we have found that the use of this program in the development of our VERSABUSINESS series decreased the programming time needed to perform the conversion by approximately 70 percent.

BUG IN MBASIC!!

As many readers are no doubt aware, bugs in commercial software packages can be extremely annoying at best, and they can interfere with the user's responsibilities at worst. One of the few places where a significant bug would be unexpected and extremely irritating is in BASIC itself. This is actually the case with MBASIC.

As I discovered (and as was confirmed by my consultation with our technical staff) in converting VERSALEDGER II to CP/M, nested FOR-NEXT loops can generate a NEXT without FOR error when such an error should not exist. Although the listings of the program lines in which such errors have occurred would be too long to include, this bug has been detected on numerous occasions by several of our programmers. *Program lines which ran without a glitch on Model II BASIC under TRSDOS generated a "Next Without For" error under CP/M's MBASIC, with no plausible explanation.*

The significance of this discovery is a lesson in program testing. No matter how sure you are that your program will run correctly, it is *crucial* to test out each line. There could always be a fault in the system, other than a software error, which would produce an error even though the error should not occur.

CP/M: LACKING IN USER-FRIENDLINESS

While on the topic of converting to CP/M, it would be appropriate to mention several observations I have made about CP/M and MBASIC in general. Personally, I refrain from using CP/M as much as possible, particularly because it lacks the user-friendliness many other operating systems have. (*NOTE:* As of our press deadline, I understand a new version of CP/M has been released which adds many features to the operating system, including several user-friendly touches. I still feel my comments regarding CP/M version 2.2 are appropriate, since that is the version virtually all users now have. However, in the interest of fairness, I will include information about the new CP/M 3.0 as soon as I have the opportunity to use it myself.) *[Editor's note: CP/M is generally available only for the TRS-80 Model II, although internal modifications are available for the Model III. CP/M is not supported by Radio Shack.]*

Perhaps the most serious difficulty in using CP/M is its lack of descriptive error messages. Virtually all disk errors under CP/M generate the rather cryptic message "BDOS ERROR ON A:", which could signify anything from fingerprints on a disk to switching disks at a time when a switch should not have taken place. Errors such as "DISK WRITE PROTECTED" or "DRIVE DOOR OPEN" do not exist. At a time when an increasing number of newcomers to the computer field are using CP/M, this lack of user friendliness can be quite irritating.

To cite one more example of CP/M's lack of user friendliness, I think *the* most serious design flaw in CP/M is its response to a drive door which has been left open. If an attempt is made to access the directory of a drive which does not contain a disk, CP/M will not generate any type of error message at all. The computer will simply "hang up" until a disk is inserted, or until the computer is rebooted. To me, this type of design flaw is inexcusable.

A QUIRK IN MBASIC'S PROGRAM EDITOR

While discussing CP/M's user friendliness, it is interesting to note one small quirk in MBASIC which, although not particularly serious, left quite a bit of curiousity in my mind when I first observed it.

Program lines in MBASIC, as well as in TRS-80 BASIC, can be edited by typing EDIT XXX and then issuing one of a group of editing commands. One of these commands (executed by typing a number and then depressing the backspace key) instructs BASIC to backspace a certain number of characters in the program line currently being edited.

Under TRS-80 BASIC (Models I, II, and III), the backspace command will literally erase a certain number of characters from the screen and backspace the cursor. Under CP/M's MBASIC, however, *additional characters will be displayed, in reverse order!*. For example, backspacing the editor when the screen displays "FOR I = 1 TO 10" will result in the display "FOR I = 1 TO 1001 OT 1 = I ROF". Again, this is not particularly serious, but rather an

amusing anomaly found in MBASIC.

ON THE COVER: INTERFACING YOUR MICROCOMPUTER

A very common question among computer owners is how to transfer data from one machine to another. There are many instances in which a need for this procedure arises. For special reasons, it is not possible to list each individual permutation of the computers used by our readers, but it is possible to describe this technique in general terms. (*Note to Multi-TRS-80 Owners:* Issue 43 contains a detailed explanation of communications between all three TRS-80's. That article can be used for specific material about program transmission. This month's article is designed to give an overview of the concept of program transmission.) First, let's examine why the need for direct program/data transmission arises.

A very common user of data transmission techniques is the commercial software house. When a program is written on one computer, it is very possible to use the same program on another computer with minimal changes. (See the first ten installments of this series for an explanation of what is involved in coverting programs between various dialects of BASIC.) Therefore, instead of rekeying the program, an automatic transfer between two computers can be extremely useful.

H & E Computronics can be used as an example of another common application of program transmission. We own over a dozen microcomputers of various types — TRS-80, APPLE, PET, ATARI, IBM, OSBORNE, etc. Articles to be typeset for the *Computronics* magazine are entered into a computer by members of our editorial staff. Ultimately, a transfer to the actual typesetting equipment is made by modem from a TRS-80.

If I want to write an article for *Computronics*, I can take home any of a dozen computers, as long as there is a word processor available for that computer. Usually I use a Model III, since it is portable and I like the Electric Pencil word processing program. After the article is written, it can be transmitted to another computer which has a printer connected and, finally, to still another *different* model computer which has the modem for transmission to our typesetting equipment. As long as a direct transfer can be made, *no retyping is ever necessary.*

A final application for program transmission occurs quite frequently when owners of 5¼-inch CP/M machines wish to use software which can be supplied only on 8-inch disks. The BASIC language used on these machines is usually identical — MBASIC 5.21. However, the medium of transfer often causes difficulties.

If the owner of a 5¼-inch CP/M machine has temporary access to an 8-inch machine, it is possible to transfer most software directly. In this manner, the 5¼-inch user gains access to a great deal of additional software.

THREE METHODS OF PROGRAM TRANSMISSION EXAMINED

There are essentially three different techniques for interfacing microcomputers to each other. The direct conversion of a disk is preferable. This can be done only in a limited number of situations — to be discussed later. A cable can be used to connect two computers in the same room. Finally, modems can be used to connect two computers via a telephone line.

DIRECT DISK CONVERSION

The easiest method of transferring data is to literally convert a disk to a new format. There are two restrictions on the use of this technique: (1) Both computers must use the same size disk, and (2) A utility program must be available to perform the conversion.

As an example, a TRS-80 Model II program stored on a TRSDOS disk may be converted directly to 8-inch CP/M by using a utility called GETFILE manufactured by *The Software Store*. A TRSDOS disk is placed into one drive, and files may easily be transferred to a CP/M disk in another drive.

DIRECT-CONNECT CABLE

If a utility program is not available, or if a program must be moved between 8-inch and 5¼-inch formats, a direct-connect cable is the preferred option. This cable is a wire which can carry a program between two computers, much in the same manner in which a telephone cable carries voices between two houses.

I have found that it is possible to wire up one cable which will operate successfully between virtually all microcomputers which have communications (RS-232) capabilities. To date, this cable has functioned correctly in every computer in which I have tried it. This cable (which was also described in issue 43) can be made by purchasing a standard DB25 extension cable (a cable which can connect the RS-232 ports on two microcomputers) and connecting the following pins:

RS232 TRANSFER CABLE DIAGRAM

SIDE A PINS		SIDE B PINS
1	----------	1
2	----------	3
3	----------	2
4	----------	4
5	----------	5
6,20	----------	8
8	----------	6,20

Note that pins 6 and 20 should be connected together at each end of the cable, and the wire connecting both of these should then be connected to pin 8 at the opposite end.

Once this cable has been constructed, it is generally necessary to purchase communications software for both computers. SMART TERMINAL from Howe Software is an example of such a software package.

Very often it is possible to write your own simplified terminal package. When the APPLE, for instance, is equipped with an RS-232 communications card and connected to another computer, data received by the computer may be input by standard GET statements. The following program may be used by the APPLE to receive data. The

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FIVE SUBROUTINES

Leemon Baird III

The following program provides five machine language subroutines. The program incorporates a unique feature which facilitates the entering of machine language code. The codes for four of the subroutines are initially entered in line 7. When the program is run, line 7 searches memory for &s and replaces them with code. Line 7 thereby puts machine language code into lines 1010-1040. The completion of this task will be indicated by a "?OD Eerror in 7". Line 7 should then be deleted. The remainder of the program may be saved to tape or disk.

When a subroutine is called, the machine language code is transfered (from line 1010, or 1020, or . . .) to a string variable A$. Line 1050 then looks up the RAM location of A$ and makes a USR call to that position.

The Subroutines

SCROLL DOWN: When writing a program which requires a downward scroll, use subroutine 1010 to lower every character on the screen. Then print a new line of data at top of screen.

SCROLL LEFT: Use subroutine 1030, then print new data along right edge of screen.

SCROLL RIGHT: Use subroutine 1020, then print new data along left edge of screen.

FILL SCREEN: Subroutine 1040 fills screen with the character in upper left corner. This subroutine is useful to instantly white out the display for games etc.

MOVE MEMORY: It is often convienient to store information by POKEing it into high RAM. This subroutine allows one to move large blocks of data to make room for insertions. To move a block of memory: LET A= address of beginning of source block. B= address of beginning of destination block. C= number of bytes to move. The source and destination blocks may overlap.

```
Ø '************************************************
1 '**      SUBROUTINES BY LEEMON BAIRD III:      **
2 '**  1Ø1Ø- scroll down     1Ø2Ø- scroll right  **
3 '**  1Ø3Ø- scroll left     1Ø4Ø- fill screen   **
4 '**  1ØØØ- move C bytes of memory from A to B  **
5 '**                                            **
6 '************************************************
7 READ G: FOR X=17385 TO 32767: IF PEEK(X)<>38 THEN NEXT ELSE
POKE X,G : READ G : NEXT : DATA 33,191,63,17,255,63,1,192,3,
237,184,2Ø1,33,254,63,17,255,63,1,255,3,237,184,2Ø1,33,1,6Ø,
17, 255,59,19,1,255,3,237,176,2Ø1,33,255,59,35,17,1,6Ø,1,255,
3,237,176,2Ø1
1ØØØ IF A<B THEN A=A+C-1 : B=B+C-1 :
X$=CHR$(184) ELSE X$=CHR$(176)
1ØØ1 A$=CHR$(33)+CHR$(A-INT(A/256)*256)+CHR$(INT(A/256))+
CHR$(17)+CHR$(B-INT(B/256)*256)+CHR$(INT(B/256))+CHR$(1)+
CHR$(C-INT(C/256)*256)+CHR$(INT(C/256))+CHR$(237)+X$+CHR$(2Ø1) :
GOTO 1Ø5Ø
1Ø1Ø A$="&&&&&&&&&&&&" : GOTO 1Ø5Ø
1Ø2Ø A$="&&&&&&&&&&&&" : GOTO 1Ø5Ø
1Ø3Ø A$="&&&&&&&&&&&&" : GOTO 1Ø5Ø
1Ø4Ø A$="&&&&&&&&&&&&"
1Ø5Ø POKE 16526,PEEK(VARPTR(A$)+1): POKE 16527,
PEEK(VARPTR(A$)+2): G=USR(Ø) : RETURN
```

Leemon Baird III
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PRACTICAL BUSINESS PROGRAMS

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```
4Ø PRINT "     C     CPA  PRINTER OUTPUT OF P&L/BALANCE SHEET"
5Ø PRINT "     M     MOVE TO MOVE FILES TO NEW DISK"
6Ø PRINT "    MI     MILES TO CALCULATE AUTO COSTS"
7Ø PRINT "     N     NAME  TO CHANGE/ADD NAME OF ORGANIZATION"
8Ø PRINT "     S     START  TO START NEW SYSTEM ****"
9Ø PRINT "     T     TRIAL FOR TRIAL BALANCE"
1ØØ PRINT "    TR     TRANSACTIONS"
11Ø PRINT "     U     UPDATE TO UPDATE/CHANGE DELETE CHART OF
ACCOUNTS"
12Ø PRINT "     Y     YEAR INITIALIZES P&L YEAR TO DATE TO START
YEAR"
13Ø INPUT "SELECTION";SU$
14Ø IF SU$="BA" THEN LOAD "BALANCE",R
15Ø IF SU$="E" THEN END
16Ø IF SU$="M" THEN LOAD "MOVE",R
17Ø IF SU$="A" THEN LOAD "ACCT",R
18Ø IF SU$="C" THEN LOAD "CPA",R
19Ø IF SU$="N" THEN LOAD "NAME",R
2ØØ IF SU$="S" THEN LOAD "START",R
21Ø IF SU$="T" THEN LOAD "TRIAL",R
22Ø IF SU$="U" THEN LOAD "UPDATE",R
23Ø IF SU$="Y" THEN LOAD "YEAR",R
24Ø IF SU$="TR" THEN LOAD "TRANS",R
25Ø IF SU$="MI" THEN LOAD "MILES",R
26Ø GOTO 1Ø
```

SUMMARY

This is the first of an eight month series of articles designed to detail a general ledger program for a small business. The GLMENU program shown will call in the program as specified.

The program is designed to operate a small business. The user of the system is expected to be familiar with accounting practice. The input of data follows the rules of the double entry bookkeeping system.

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THE NEW STAR OF THEIR SHOW

Michael Herbert Shadick

Although it opened less than three years ago, the Carlton Celebrity Room has already become a leading night spot of the entire Minneapolis and Saint Paul Twin cities area. Attracting top names in show business such as Ray Charles, Johnny Cash, Rich Little, and numerous other national luminaries, the Carlton is rapidly acquiring a reputation as being *the* place for Twin Citians to come for the very best in entertainment.

"In some ways, our success has happened a little too fast," reports the Carlton's general manager, David Carey. "You see, we seat upwards of 1,200 patrons per show, and we have two shows per night. That's a lot of reservations, and a lot of tickets! And frankly, until a few months ago we were having our share of reservation and ticketing screw-ups—and then some!"

According to Carey, the proverbial you-know-what really hit the fan last February, when a Carlton reservations clerk inadvertantly "lost" several hundred reservations for an upcoming show. "We had to call all those people on the phone," recalls Carey, "and tell them that they'd have to make new reservations. And in many cases, we really didn't know who to call! Man, were our faces *red!*"

So were the Carlton's ledger sheets. By the time that everything got straightened out, the mixup had cost the Carlton, in round figures, a cool $100,000 in lost revenues. Not to mention some very unhappy customers.

"About the only thing we know for sure," Carey recalls, "is that something like this could never, ever be allowed to happen again. Yet, what could we do to prevent it?"

Enter, the Carlton's new star!

A friend of Manager Carey, who happened to be into TRS-80 computing, gave him an idea: why not set up the entire reservations and ticketing process on *computer?* That way, no reservations could be lost or misplaced, and the whole process would go a lot, lot smoother.

Well, it all *sounded* good in theory, yet Carey wasn't at all convinced. "I knew next to nothing about computers," he admits, "and I was honestly a bit skeptical."

Luckily for Carey—and the Carlton!—his TRS-80 friend had sufficient BASIC programming knowledge to set up a reservations and ticketing "prototype" program on his own system. That's all it took to convince Carey that it could indeed do the job. "When I saw that TRS-80 processing and storing reservations data," he notes, "I was impressed. And when I saw it printing actual tickets, I was sold!"

One of the innovative aspects of this particular program is that it can command the system's printer to print out tickets for one Carlton performance—or for a whole week's worth! The idea to use the reservation printouts as tickets was Carey's "Here the TRS-80 was furnishing the answer to our prayers," he observes, "and my friend didn't even see the ticketing possibilities. But of course, he's not in the entertainment business."

Well, now the Carlton is *really* in business. Carey has subsequently acquired a TRS-80 (III) for the Carlton—along with appropriate software and printers—to take care of all reservations and ticketing needs, now and in the forseeable future. "We'll undoubtedly find many more uses for the system," Carey reports. "But for now, we're just getting the few minor kinks ironed out—and marvelling at how smoothly our entire reservations and ticketing procedure is running! The improvement is nothing short of a major miracle, to hear our reservations clerks tell of it. They really don't know how we ever got along without it. Neither do I!"

Since the Carlton went "on computer," not a single reservation has been lost. Not at all surprisingly, Carey strongly recommends such a TRS-80 based system for any theatre, anywhere—with no reservations!

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DISK CHECKBOOK MAINTENANCE SYSTEM

David White

In issue number 32 of COMPUTRONICS I found Bill Evans' modification of Dr. Peter Shenkin's checkbook maintenance program. I was impressed with the capabilities offered and lost no time keying in and debugging the program. I started entering my checks from the start of the year so I could list them categorically and see where my buget had gone wrong.

After going through two months' checks and losing them in my cassette recorder, I knew the program needed a speed-up mod. Disk I/O and a printed copy were my first goals, and, as usual, once I got to changing it I got carried away. Most of the changes were to combine entries and allow default or automatic entries for faster input. All the comments made by Bill Evans in issue 32 still apply, but I will go through the menu categories one by one explaining my modifications.

My system is a Mod I level II with a LNW 32K expansion kit, and one 5 1/4 inch Aerocomp floppy drive. I am now using NEWDOS/80, but I have tried to keep the program compatible with Radio Shack's DOS. I use Disk Scripsit for my word processor with the lowercase mod I found in *Kilobaud Microcomputing* April 1980, page 132. I use a Radio Shack line printer II for hard copy, but I need better quality print. I got the computer second hand in a deal I couldn't refuse. I added the lowercase mod and then the LNW when I got fed up with cassettes. The combination works very well together, and most programs run on it.

Here are my changes to the checkbook maintenence program:

A) SET UP NEW CHECKBOOK — This option zeros memory and starts a new checkbook. If you just want to add to checks already in memory, this is not the way to do it.

B) RECALL CHECKBOOK FROM TAPE OR DISK — Here you have a choice of disk or tape input. To select tape, type "T". Anything else looks for a disk file. Step 2240 is the beginning of the file input subroutine. It asks for the number of the month for the checks you want (1-12) and builds a filespec using that number. On disk the file name looks like CKS1/TXT for January, and CKS(2-12)/TXT for the rest of the months. You can increase the number of files by modifing line #2240 and 2170.

C) ADD TO EXISTING CHECKBOOK — I made several changes here:

1) I removed the input safeguards on the date because 1/1/81 is faster than 01/01/81. You can use the last used date by just hitting ENTER.

2) In line 1850, if you enter "D" you have a deposit. If you hit "ENTER," you get the next sequential check number, or you can input the check number. If you input a check number smaller than the previous one, you are warned that the number is out of order. You can continue anyway by selecting (Y/N). This is a feeble attempt to avoid duplicate entries, which are a pain to get rid of.

3) At the question "check category type," I added the option to type "-1"to quickly review the categories before answering the question. This memory aid is also available in the "deposit category type"question. I have added the option of typing "ENTER" to get the most frequently used "category type." In my case it is FOOD, but you can change it in line #1950 for checks and line # 2070 for deposits.

4) At line #2120 I combined three steps: an "E"rror ignores the previous entry and puts you back ready to make another entry. An "S"top takes you to the menu, and an "ENTER" takes you back for the next entry.

D) SAVE CHECKBOOK ON DISK OR TAPE — Here again output to a disk or tape is possible. CAUTION! In order to avoid destroying previous check information on the disk adding to any month's files must go in this order.

1) Be sure to read in disk files for the month by selecting menu item "B".

2) Then by using menu item "C," you can add to existing checks.

3) Now, the combined information can be written back onto the disk by selecting "D". This option overwrites the file for the month you ask for on the disk. The old information will be lost unless it is in memory.

E) REVIEW OF CHECKBOOK INCOME/EXPENSE CATEGORIES — No funtional changes but some code changes have occured.

F) LIST AND/OR PRINT CHECKBOOK 10 ENTRIES AT A TIME — Here you can select the deposit or check number to start the listing at. This avoids having to look at all the entries to see one half way through. You can also put your listing out to a parallel printer.

G) No change

H) No change

I) I had to make changes to correct the way the balance was updated if an amount was changed.

The rest of the program remains the same, even if it appears in a differnt location. NEWDOS's RENUMBER option was surely helpful. I feel that with the disk I/O and the other changes, this program can be very useful to the individual or business that needs to keep track of their checks and expenditures.

```
10 'CHECKBOOK MAINTENENCE PROGRAM (CHECKS CN S FOR SEQUENCE)
20 '8/30/81
30 CLEAR 15000:V=500:DIMCN$(V),D$(V),P$(V),T%(V),A(V),B(V)
40 'ROUTINE WITH PRINT USING FORMAT VARIABLES
50 H$="CHK NO.  DATE      CHK ISSUED TO       TYPE   AMOUNT
   BAL. !"
60 Z$="%   % %        % %                  %##  $$####.##
 $####.##"
70 Z1$="      %        %
                                  $$####.##"
80 'MENU ROUTINE
90 CLS: PRINT TAB(20)"CHECKBOOK MAINTENANCE SYSTEM": PRINT
100 PRINT "A)  SET UP NEW CHECKBOOK"
110 PRINT "B)  RECALL CHECKBOOK FROM TAPE OR DISK"
120 PRINT "C)  ADD TO EXISTING CHECKBOOK"
130 PRINT "D)  SAVE CHECKBOOK ON TAPE OR DISK"
140 PRINT "E)  REVIEW OF CHECKBOOK INCOME/EXPENSE CATEGORIES"
```

```
15Ø PRINT "F)  LIST AND/OR PRINT CHECKBOOK 1Ø ENTRIES AT A
TIME"
16Ø PRINT "G)  LIST CHECKS BY CATEGORY"
17Ø PRINT "H)  DELETE PREVIOUS CHECK"
18Ø PRINT "I)  CORRECT PREVIOUS CHECK"
19Ø PRINT "J)  VERIFICATION"
2ØØ PRINT "K)  END THIS PROGRAM"
21Ø PRINT:PRINT TAB(2Ø) "CHOOSE OPTION"
22Ø GOSUB 172Ø:IF (KB<65) OR (KB>75) GOTO 22Ø ELSE ON KB-64
GOSUB 23Ø,3ØØ,183Ø,37Ø,44Ø,71Ø,83Ø,1ØØØ,1Ø7Ø,116Ø,169Ø: GOTO
8Ø
23Ø 'SUB FOR SETTING UP NEW CHECKBOOK
24Ø CLS: PRINT"------CAUTION------- THIS OPTION ERASES ALL
ENTRIES! DO YOU WANT TO CONTINUE (Y OR N)"
25Ø GOSUB 172Ø: IF KB<>89 RETURN
26Ø CLS :I=1 : E=Ø: PRINT CHR$(23)
27Ø INPUT "INITIAL BALANCE";B(Ø)
28Ø 'CHECK OR DEPOSIT
29Ø CLS : GOSUB 183Ø : RETURN
3ØØ 'SUB FOR INPUTTING OLD CHECKBOOK FROM TAPE
31Ø CLS : PRINT"'T' FOR TAPE 'ENTER' FOR DISK": GOSUB 172Ø:
IF KB<>84 GOSUB 223Ø: RETURN
32Ø CLS: PRINT"PUT & POSITION DATA TAPE IN CASETTE "
33Ø PRINT "PRESS THE ";CHR$(34);"PLAY";CHR$(34);" BUTTON"
34Ø PRINT "PRESS ENTER WHEN READY";: INPUT Q: PRINT : PRINT
: PRINT "THE CHECKBOOK IS LOAOING. THE PROGRAM WILL RETURN TO
THE MENU AFTER THE CHECKBOOK HAS BEEN LOAOEO."
35Ø INPUT #-1,E,CN$(Ø),B(Ø),D$(Ø)
36Ø FOR I=1TO E: INPUT #-1,CN$(I),D$(I),P$(I),T%(I),A(I),B(I)
: NEXT I: RETURN
37Ø 'SUB FOR TAPE OR DISK OUTPUT
38Ø CLS : INPUT "T FOR TAPE, ENTER FOR DISK";E$:IF E$="" THEN
216Ø
39Ø CLS : PRINT "PUT AND POSITION BLANK TAPE INTO CASSETTE"
4ØØ PRINT "PRESS PLAY ANO RECORO BUTTONS"
41Ø PRINT "PRESS ENTER WHEN REAOY"; : INPUT Q : PRINT : PRINT
: PRINT "THE CHECKBOOK IS NOW BEING SAVED ON TAPE.  THE
PROGRAM WILL RETURN TO THE MENU AFTER THE CHECKBOOK HAS BEEN
SAVED."
42Ø PRINT #-1,E,CN$(Ø),B(Ø),D$(Ø)
43Ø FOR I=1 TO E: PRINT #-1,CN$(I),D$(I),P$(I),T%(I),A(I),
B(I) : NEXT I: RETURN
44Ø 'SUB TO REVIEW INCOME/EXPENSE CATEGORIES
45Ø GOSUB 5ØØ
46Ø PRINT: PRINT TAB(15) "PRESS ENTER TO CONTINUE ";: INPUT Q
47Ø IF Q=Ø GOSUB 65Ø ELSE RETURN
48Ø PRINT: PRINT TAB(15) "PRESS ENTER TO CONTINUE ";: INPUT Q
49Ø RETURN
5ØØ CLS:PRINT "EXPENSE":PRINT "CATEGORY   DESCRIPTION"
51Ø PRINT "    1        DONATIONS (TAX DEDUCTABLE)"
52Ø PRINT "    2        MORTGAGE"
53Ø PRINT "    3        GAS"
54Ø PRINT "    4        TELEPHONE"
55Ø PRINT "    5        FOOO"
56Ø PRINT "    6        LOANS"
57Ø PRINT "    7        DOCTORS/MEDICAL"
58Ø PRINT "    8        TRANSPORTATION"
59Ø PRINT "    9        HOUSEHOLD EXPENSE"
6ØØ PRINT "   1Ø        WORK EXPENSES"
61Ø PRINT "   11        CLOTHES"
62Ø PRINT "   12        MISC"
63Ø PRINT "   49        CHECK FEE"
64Ø RETURN
65Ø CLS: PRINT "INCOME": PRINT "CATEGORY     DESCRIPTION"
66Ø PRINT "    5Ø        SALARY"
67Ø PRINT "    51        EXPENSE CHECKS"
68Ø PRINT "    52        MISCELLANEOUS"
69Ø PRINT "    99        INTEREST"
7ØØ RETURN
71Ø 'SUB TO REVIEW CHECKBOOK
72Ø CN$="": CLS : INPUT "STARTING CHECK OR DEPOSIT NUMBER";
CN$: IF LEN(CN$)=Ø I=1: GOTO 75Ø
73Ø FOR I=1 TO E: IF CN$<>CN$(I) NEXT I
74Ø IF CN$<>CN$(I) PRINT @ 276,"CHECK NOT FOUND": FOR K=1 TO
75Ø: NEXT K: RETURN
75Ø FLG=Ø: PRINT "LIST ON THE PRINTER (Y OR N)": GOSUB 172Ø:
IF KB=89 FLG=3
76Ø CLS: GOSUB 175Ø: PRINT USING Z1$;D$(Ø);B(Ø)
77Ø FOR I=I TO E: GOSUB 177Ø:IF I/1Ø=INT(I/1Ø) GOSUB 8ØØ
78Ø NEXT I
79Ø PRINT :PRINT "THE END.  PRESS ENTER TO RETURN TO MENU";:
INPUT Q: RETURN
8ØØ 'SUB FOR TEN ENTRY SCREEN DISPLAY
81Ø IF LEN(CN$(I+1))=Ø RETURN
82Ø PRINT : PRINT "PRESS ENTER FOR MORE ENTRIES ";: INPUT Q :
CLS : GOSUB 175Ø : RETURN
83Ø 'SUB TO LIST BY CATEGORIES
84Ø 'E1 IS TOTAL OF ITEM
85Ø CLS : CN$="Ø": INPUT "BEGINNING CHECK NUMBER";CN$: IF
CN$="Ø" I=1: GOTO 88Ø
86Ø FOR I=1 TO E: IF CN$<>CN$(I) NEXT I
87Ø IF CN$<>CN$(I) PRINT "ENTRY NOT FOUND": FOR T=1 TO 1ØØØ :
NEXT T : RETURN
88Ø E1=Ø:N=Ø: INPUT"INPUT CATEGORY OF INTEREST";Z5: GOSUB
175Ø
89Ø FOR I=ITO E: IF T%(I)=Z5 GOTO 9ØØ ELSE GOTO 91Ø
9ØØ GOSUB 177Ø:E1=E1+A(I):N=N+1:IFN/1Ø=INT(N/1Ø)GOSUB 93Ø
91Ø NEXT I
92Ø PRINT : PRINT TAB(1Ø) "PRESS ENTER FOR TOTAL"; : INPUT Q
: GOTO 96Ø
93Ø 'SUB FOR TEN ENTRY DISPLAY
94Ø IF LEN(CN$(I+1))=Ø RETURN
95Ø PRINT : PRINT TAB(1Ø) "PRESS ENTER TO CONTINUE LISTING";
: INPUT Q$: IF Q$="N" RETURN : CLS : GOSUB 175Ø: RETURN
96Ø 'SUB FOR TOTAL
97Ø CLS : PRINT CHR$(23) : PRINT : PRINT : PRINT "TOTAL FOR
THIS ITEM" : PRINT "IS "; : PRINT USING "$$###.##";E1
98Ø CN$="Ø": PRINT : PRINT "OO YOU WANT TO LIST ANY MORE":
PRINT "CATEGORIES (Y/N)?"
99Ø GOSUB 172Ø:IF KB=89 THEN 83Ø ELSE IF KB=78 THEN RETURN
ELSE 99Ø
1ØØØ 'SUB TO OELETE A CHECK
1Ø1Ø CLS:INPUT "NUMBER OF CHECK TO BE DELETED";CN$
1Ø2Ø FOR I=1 TO E: IF CN$<>CN$(I) NEXT I
1Ø3Ø IF CN$<>CN$(I) PRINT @ 276,"CHECK NOT FOUNO": FOR K=1 TO
75Ø : NEXT K: RETURN
1Ø4Ø A=A(I)
1Ø5Ø FOR J=I+1 TO E : CN$(J-1)=CN$(J) : D$(J-1)=D$(J) :
P$(J-1)=P$(J) : T%(J-1)=T%(J) : A (J-1)=A(J) : B(J-1)=B(J)+A
: NEXT J
1Ø6Ø E=E-1: RETURN
1Ø7Ø 'SUB TO CORRECT AN ENTRY
```

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108Ø CLS : PRINT "CHECK NO. (OR "CHR$(34);"D #";CHR$(34);" IF
DEPOSIT) OF ENTRY TO BE CHANGED";: INPUT CN$: IF LEN(CN$)=Ø
GOTO 108Ø
109Ø FOR I=1 TO E: IF CN$<>CN$(I) NEXT I
11ØØ IF CN$<>CN$(I) PRINT "ENTRY NOT FOUND": FOR T=1 TO 1ØØØ
: NEXT T : RETURN
111Ø IF LEFT$(CN$(I),1)="D" THEN FLG=1 ELSE FLG=2
112Ø CLS : PRINT TAB(15)"NEW CHECKBOOK ENTRY": PRINT "(IF NEW
DATA IS THE SAME AS PREVIOUS DATA JUST PRESS ENTER)" : PRINT
: GOSUB 175Ø : GOSUB 178Ø : GOSUB 185Ø
113Ø RETURN
114Ø FLG=Ø: IF LEFT$(CN$(I),1)="D" FOR J=(I+1) TO E :
B(J)=B(J)+A1 : NEXT J : RETURN
115Ø FOR J=(I+1) TO E :B(J)=B(J)-A1: NEXT J: RETURN
116Ø 'SUB TO VERIFY BALANCE WITH BANK STATEMENT
117Ø 'SUB FOR INTEREST CHECKING
118Ø CLS:PRINT"IS THIS AN INTEREST CHECKING ACCOUNT (Y/N)?"
119Ø GOSUB 172Ø: IF KB=89 THEN 12ØØ ELSE IF KB=78 THEN 127Ø
ELSE 119Ø
12ØØ CLS : PRINT "WHAT IS THE AMOUNT OF INTEREST APPEARING ON
THE BANK STATEMENT? (IF Ø ENTER Ø)";: INPUT A$: IF LEN(A$)=Ø
THEN 12ØØ ELSE IF VAL(A$)=Ø THEN CLS : GOTO 126Ø
121Ø E=E+1:I=E
122Ø CN$(I)="INT" : P$(I)="INTEREST" : T%(I)=99 :
A(I)=VAL(A$) : B(I)=B(I- 1)+A(I)
123Ø CLS: GOSUB 175Ø: GOSUB 181Ø: GOSUB 177Ø: FOR K=1 TO 4:
NEXT
124Ø PRINT: PRINT TAB(1Ø)"IF ERROR INPUT E OTHERWISE PRESS
ENTER";: INPUT Z8$: CLS
125Ø IF Z8$="E" : Z8$="ZZZZ" : CN$(I)="" : D$(I)="": P$(I)=""
: T%(I)=Ø : A(I)=Ø  : B(I)=Ø : E=E-1 : GOTO 116Ø
126Ø 'SUB FOR CHECK FEES
127Ø PRINT : PRINT "IS THERE A PER CHECK CHARGE (Y/N)?"
128Ø GOSUB 172Ø: IF KB=89 GOTO 129Ø ELSE IF KB=78 THEN 138Ø
ELSE GOTO 128Ø
129Ø CLS: INPUT"WHAT IS THE CHARGE PER CHECK(IN CENTS)";F: IF
F=Ø THEN 129Ø
13ØØ PRINT "HOW MANY CANCELLED CHECKS WERE RECEIVED WITH THIS
STATEMENT. (ENTER Ø IF NONE)?";: INPUT N$: IF LEN (N$)=Ø GOTO
13ØØ
131Ø N=VAL(N$): IF N=Ø THEN 137Ø ELSE E=E+1:I=E
132Ø INPUT "ENTER DATE IN THE FORM MM/DD/YY";D$(I): IF
LEN(D$(I))>8 THEN 132Ø
133Ø CN$(I)="FEE":P$(I)="CHECK FEES": T%(I)=49 : A(I)=F*N/1ØØ
: B(I)=B(I-1)-A(I)
134Ø CLS : GOSUB 175Ø : GOSUB 181Ø : GOSUB 177Ø: FOR K=1 TO 4
: NEXT
135Ø PRINT : PRINT TAB(1Ø)"IF ERROR INPUT E OTHERWISE PRESS
ENTER";: INPUT Z8$: CLS
136Ø IF Z8$="E" Z8$="ZZZZ" : CN$(I)="" : D$(I)="" : P$(I)=""
: T%(I)=Ø : A(I)=Ø: B(I)=Ø: E=E-1: GOTO 126Ø
137Ø CLS
138Ø 'SUB FOR MISC. CHARGES
139Ø PRINT : PRINT "ARE THER ANY MISC. CHARGES OR SERVICE
CHARGES (Y/N)?"
14ØØ GOSUB 172Ø: IF KB=89 GOTO 141Ø ELSE IF KB=78 THEN 151Ø
ELSE 14ØØ
141Ø E=E+1: I=E:CN$(I)="MC":CLS
142Ø INPUT "WHY CHARGED TO ACCOUNT (MAX 2Ø CHARACTERS";
P$(I):IF (LEN(P$(I))=Ø) OR (LEN(P$(I))>2Ø) GOTO 142Ø
143Ø INPUT "CHARGE CATEGORY TYPE";T%(I): IF (T%(I)=Ø) RO
(T%(I)>99) GOTO 143Ø
144Ø INPUT "CHARGE AMOUNT";A(I):IF A(I)=ØGOTO 144Ø
145Ø B(I)=B(I-1)-A(I)
146Ø CLS : GOSUB 175Ø : GOSUB 181Ø : GOSUB 177Ø : FOR K=1 TO
4 : NEXT
147Ø PRINT : PRINT TAB(1Ø)"IF ERROR INPUT E OTHERWISE PRESS
ENTER";: INPUT Z8$
148Ø IF Z8$="E" Z8$="ZZZZ" : CN$(I)="" : P$(I)="" : T%(I)=Ø :
A(I)=Ø : B(I)=Ø : CLS : E=E-1  : GOTO 139Ø
149Ø PRINT TAB(1Ø)"ANY MORE MISC. CHARGES (Y/N)?"
15ØØ GOSUB 172Ø: IF KB=78 GOTO 151Ø ELSE IF KB=89 GOTO 141Ø
ELSE GOTO 15ØØ
151Ø CLS
152Ø PRINT "ENTER CANCELLED CHECK NO. (ENTER ";CHR$(34);"Ø";
CHR$(34);" IF NONE.)";: INPUT CN$: FOR I=1 TO E: IF
CN$(I)<>CN$ THEN NEXT I
153Ø IF CN$="Ø" GOTO 156Ø
154Ø IF CN$(I)<>CN$ PRINT "CHECK NOT FOUND": GOTO 152Ø
155Ø CN$(I)="P-"+CN$(I): GOTO 152Ø
156Ø CLS
157Ø PRINT "ENTER DEPOSIT NO. (D #) CREDITED TO ACCOUNT.
(ENTER Ø IF NONE.)";: INPUT CN$: FOR I=1 TO E: IF CN$(I)<>CN$
NEXT I
158Ø IF CN$="Ø" GOTO 161Ø
159Ø IF CN$(I)<>CN$ PRINT "DEPOSIT NOT FOUND": GOTO 157Ø
16ØØ CN$(I)="+"+CN$(I): GOTO 157Ø
161Ø CLS : PRINT : PRINT : INPUT "ENTER BANK STATEMENT
BALANCE";BB
162Ø OC#=Ø : OD#=Ø : FOR I =1 TO E: IF (LEFT$(CN$(I),1)="+")
OR (LEFT$(CN$(I),1)="P") OR (CN$(I)="MC") OR (CN$(I)="INT")
OR (CN$(I)="FEE") THEN 164Ø
163Ø IF LEFT$(CN$(I),1)="D" OD#=INT(1ØØ*(OD#+A(I)))/1ØØ ELSE
OC#=INT(1ØØ*(OC#+A(I)))/1ØØ
164Ø NEXT I: CB=B(E)+OC#-OD#: ER=INT(1ØØ*(BB=CB))/1ØØ
165Ø IF ER=Ø: CLS : PRINT "THE CHECKBOOK BALANCE OF ";: PRINT
USING "$$###.##";B(E);: PRINT " IS CORRECT.": GOTO 168Ø
166Ø IF ER>0: CLS : PRINT "THE CHECKBOOK BALANCE OF ";: PRINT
USING "$$###.##";B(E);: PRINT " IS ";:PRINT USING "$$###.##";
ER;: PRINT " LESS THAN IT": PRINT "SHOULD BE.": GOTO 168Ø
167Ø CLS : PRINT "THE CHECKBOOK BALANCE OF ";: PRINT USING
"$$###.##;B(E);: PRINT " IS ";: PRINT USING "$$##.##";
ABS(ER);: PRINT " GREATER THAN IT": PRINT " SHOULD BE."
168Ø PRINT : PRINT : PRINT "THE BANK STATEMENT BALANCE IS";:
PRINT USING"$$###.##";BB;: PRINT ".": PRINT @ 96Ø," PRESS
ENTER TO RETURN TO MENU.";: INPUT Q: RETURN
169Ø 'SUB TO END
17ØØ CLS : PRINT "ARE YOU SURE YOU ARE READY TO END (Y/N)?"
171Ø GOSUB 172Ø: IF KB=89 END ELSE IF KB=78 THEN RETURN ELSE
171Ø
172Ø 'SUB USING INKEY$
173Ø KB$=INKEY$: IF KB$="" GOTO 173Ø
174Ø KB=ASC(KB$): RETURN
175Ø 'SUB FOR PRINTING FORMATS
176Ø PRINT USING H$;ZZ$: RETURN
177Ø 'SUB FOR PRINTING CHECKBOOK INFORMATION
178Ø PRINT USING Z$;CN$(I);D$(I);P$(I);T%(I);A(I);B(I)
179Ø IF FLG=3 LPRINT TAB(1Ø);USING Z$;CN$(I);D$(I);P$(I);
T%(I);A(I);B(I)
18ØØ RETURN
181Ø 'SUB FOR PRINTING PREVIOUS BALANCE
182Ø PRINT USING Z1$;D$(I-1);B(I-1): RETURN
```

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183Ø 'SUB FOR ADDING TO CHECKBOOK
184Ø CLS:E=E+1:I=E
185Ø INPUT "ENTER DATE IN THE FORM MM/DD/YY. FOR THE SAME
DATE PRESS ENTER",D$(I): IF LEN(D$(I))=Ø THEN D$(I)=D$(I-1):
IF LEN(D$(I))>8 GOTO 185Ø
186Ø IF FLG =1 GOTO 2Ø4Ø ELSE IF FLG=2 GOTO 187Ø
187Ø PRINT "TYPE CHECK NUMBER OR 'D' FOR DEPOSIT (JUST ENTER
FOR SEQUENTIAL CHECK NUMBERS)"
188Ø INPUT CN$(I): IF LEN(CN$(I))<>0 THEN 19ØØ
189Ø LET C=VAL(CN$(I-1))+1: LET CN$(I)=STR$(C): LET
L1=LEN(CN$(I)) : LET L1=L1-1 : LET CN$(I)=RIGHT$(CN$(I),(L1))
19ØØ IF CN$(I)="D" GOTO 199Ø
191Ø IF CN$(I)=<CN$(I-1) PRINT "CHECKS OUT OF SEQUENCE!
CONTINUE? (Y/N)" : GOSUB 172Ø : IF KB=78 GOTO 187Ø : IF
KB<>89 THEN 191Ø
192Ø INPUT "CHECK ISSUED TO (MAX 2Ø CHARACTERS)";P$(I): IF
(LEN(P$(I))=Ø) OR (LEN(P$(I))>2Ø) THEN 192Ø
193Ø INPUT "CHECK CATEGORY TYPE (-1 FOR LIST)";T%(I): IF
(T%(I))>99 THEN 193Ø
194Ø IF (T%(I))=-1 GOSUB 5ØØ. GOTO 193Ø
195Ø IF (T%(I))=Ø LET T%(I)=5
196Ø A=A(I)
197Ø INPUT "CHECK AMOUNT";A(I): IF A(I)=Ø THEN 197Ø ELSE
A1=A(I)-A
198Ø B(I)=B(I-1)-A(I): GOTO 211Ø
199Ø CN$(I)="": FOR I=E TO 1 STEP -1
2ØØØ IF LEFT$(CN$(I),1)="D" THEN CN$=CN$(I) : I=E :
CN=VAL(RIGHT$(CN$,LEN(CN$)-1)) : CN=CN+1 : CN$(I)=
"D"+STR$(CN) : GOTO 2Ø4Ø
2Ø1Ø IF LEFT$(CN$(I),2)="+D" THEN CN$=CN$(I) : I=E :
CN=VAL(RIGHT$(CN$,LEN(CN$)-2)) : CN=CN+1 : CN$(I)=
"D"+STR$(CN) : GOTO 2Ø4Ø
2Ø2Ø IF I=1 THEN I=E:CN$(I)="D 1": GOTO 2Ø4Ø
2Ø3Ø NEXT
2Ø4Ø INPUT "WHAT WAS DEPOSITD (MAX 2Ø CHAR)";P$(I): IF
(LEN(P$(I))=Ø) OR (LEN(P$(I))>2Ø) GOTO 2Ø4Ø
2Ø5Ø INPUT "DEPOSIT CATEGORY TYPE (-1 FOR REVIEW)";T%(I): IF
(T%(I))>99) THEN 2Ø5Ø
2Ø6Ø IF (T%(I))=-1 GOSUB 65Ø: GOTO 2Ø5Ø
2Ø7Ø IF (T%(I))=Ø LET T%(I)=5Ø
2Ø8Ø A=A(I): INPUT "AMOUNT DEPOSITED";A(I): IF A(I)=Ø THEN
2Ø8Ø
2Ø9Ø A1=A(I)-A
21ØØ B(I)=B(I-1)+A(I)
211Ø IF(FLG=1) OR (FLG=2) GOTO 114Ø
212Ø CLS : GOSUB 175Ø: GOSUB 181Ø: GOSUB 177Ø: FOR K=1 TO 4:
NEXT
213Ø  PRINT "IF ERROR INPUT E OR S TO STOP OTHERWISE PRESS
ENTER": GOSUB 172Ø
214Ø IF KB=69 Z8$="ZZZZ" : CN$(I)="" : D$(I)="" : P$(I)="" :
T%(I)=Ø : A(I)=Ø : B(I)=Ø :  CLS : E=E-1 : GOTO 184Ø
215Ø IF KB=83 THEN RETURN ELSE 184Ø
216Ø 'SUB TO CREATE DISK FILES
217Ø INPUT "ENTER THE MONTH NUMBER (1-12)";A3: IF A3<1 OR
A3>12 THEN 217Ø
218Ø A3=INT(A3): A3$=STR$(A3): B3=LEN(A3$):
A4$=RIGHT$(A3$,B3-1)
219Ø DF$="CKS"+A4$+"/TXT"
22ØØ OPEN "O",1,DF
```

continued on page 58

POCKET COMPUTER CORNER

S. M. Zimmerman, Ph. D. and L. M. Conrad

A SET OF ROUTINES FOR THE NORMAL AND STUDENT DISTRIBUTIONS

This collection or routines is designed to find the area of the normal distribution and Student t distribution for all values of X. The program will produce any of the following alternatives:

Type	Area
I	Area from negative infinity to X. (left tail)
II	Area from the mean to X.
III	Area from X to positive infinity (right tail)
IV	Two tails
V	The middle of two tails

The idea of classifying the method in which areas were calculated was first developed by the authors in a series of two articles published in *MICROCOMPUTING* in 1981 and 1982. These articles reviewed programs which were written for the Model I and III Radio Shack computers and made use of the graphics built into these machines.

THEORY of the Normal and Student Distributions

The normal distribution may be completely defined by its mean and standard deviation, while the Student t distribution is defined by its mean, standard deviation, and its degree of freedom. In both cases the distributions go from negative infinity to positive infinity and the area under the curve is one.

The reasons there are so many ways to look up the area under a normal and Student t curve is because of the many uses the curves are put too. In safety stock theory one often speaks of the probability of stock outage, a type three right tail test. While, when doing a project management study, it is common to seek the probability of completing a project on time, a left tail type I curve. In quality control work two sided tests are common as well as both right and left tail tests.

The equations for both the normal and Student t distributions are such that one can not directly find the area under the curve. Approximation methods have been developed and are used in our program. For the normal distribution the approximation method will yield results with only minor round-off differences from those found in normal tables. For the Student t distribtution with small values of degrees of freedom and a small value of t, the approximation is poor. We do not recommend the use of our results for less than or equal to five degrees of freedom until you have checked out the approximation with care and are aware of the limitations. For greater than five degrees of freedom the results agree with published tables.

Most normal tables use what is called the "Z" statistic. This value is simply a scale change of the data under study for the purpose of table look up. First the value is centered by subtracting the mean from it. It is then reduced by dividing by the standard deviation. The "Z" statistic may then be used to look up values in a table.

The Student t distribution works in a similar fashion,except the statistic is called a "t" rather than a "Z" value. First the value is centered by subtracting the mean and then it is reduced by dividing by the standard deviation. (Care must be taken when using both distributions to use the standard deviation associated with the specific statistic under consideration).

USING THE PROGRAM

The main menu gives the user two choices:

```
NOR STU?
```

NOR stands for the normal distribution while STU stands for the Student t distribution. If you selected NOR the next thing the computer does is to print the word NOR on the printer, if turned on, or on the display if the printer is not available. (For those using display output it is necessary to hit ENTER after each printed display to tell the computer to continue.)

The next question is:

```
MU SIGMA X?
```

MU the average, and SIGMA the standard deviation, define the normal distribution. X when combined with the type of curve classification, identifies the area of interest. Assume we are interested in the area to the right of 112 for a normal distribution with a mean of 78 and a standard deviation of 33. We would answer the above question with a 78, then a 33, followed by a 112.

After we have answered the question the computer will print the following:

```
MU 78.
SIGMA 33.
X 112.
```

and ask the following question:

```
TYPE I II III IV V?
```

Since we are interested in the area to the right of 112, we are interested in a Type III curve. The answer to the question must be III followed by an ENTER. After we have answered the above there is a short delay followed by:

```
III P(X)= .1516
```

and the main menu.

We may now select the STU option. To demonstrate the

relationship between the normal and Student t distributions we decided to use the same example as above for 30 and 500 degrees of freedom. (The only difference between the normal and Student t runs, is that you will be asked to input the DF, (degrees of freedom) after you have selected the type of curve in a Student t run. The results of the two runs were:

```
STU
MU 78.
SIGMA 33.
X 112.
DF              30.
III P(X) = 0.1558
```

and

```
STU
MU 78.
SIGMA 33.
X 112.
DF              500.
III P(X) = 0.1519
```

Theory tells us the Student t approaches the normal distributions as the degrees of freedom approach infinity. This is borne out by the results obtained above.

EXAMINING THE PROGRAM

The first two lines of the program input the menu selection and the data needed to define a normal distribution. In addition, line 1 prints the input for the record if a printer is being used. If you do not have a printer, we recommend you delete the print statements in line 1 to increase the speed of operations.

Line 2 is included to tell the computer when the value of X falls below the mean. The program can handle this problem with ease but a marker is needed.

Line 3 is used to select the type of curve under study and line 4 directs the flow of the program to line 10 if the menu selection was NOR.

In line 5 the degrees of freedom are inputted and printed. We again recommend you delete the print statement if you do not plan to use printer output.

Line 6 directs the flow of the program to line 50 if STU was selected, while line 7 directs the program back to line 1 if an illegal menu selection was made.

Line 10 contains the calculations for the normal distribution. It consists of the calculation of "Z", called X in our program, and the calling of the subroutine in line 20 which does the calculations for both normal and Student t distributions.

The output is adjusted for the type of curve in lines 11 through 15. After it is prepared, it is printed in line 16 and the flow of the program is returned to line 1, the main menu by line 17.

In lines 20-23 is the subroutine used to calculate the area for both normal and Student distributions. We selected the approximation which uses X to the fourth power. We use XXXX in place of raising X to the fourth power.

Lines 50 through 56 are used to find the area of the Student t distribution assuming the number of degrees of freedom are less than 5. This is the approximation which does not work well for small values of the t statistic.

PROGRAM LISTING

```
1:USING :INPUT "NOR STU?";A$:PRINT A$:INPUT "MU SIGMA
 X?";B,C,G:PRINT "MU ";B:PRINT "SIGMA ";C:PRINT "X ";G
 :V=Ø
2:IF G<B LET V=99
3:INPUT "TYPE I II III IV V?";Z$
4:IF A$="NOR" THEN 1Ø
5:INPUT "DF?";E:PRINT "DF",E
6:IF A$="STU" THEN 5Ø
7:GOTO 1
1Ø:X=(G-B)/C:GOSUB 2Ø
11:IF Z$="I" IF V=99 LET P=1-P
12:IF Z$="II" LET P=P-.5:IF V=99 LET P=Ø
13:IF Z$="III" LET P=1-P:IF V=99 LET P=1-P
14:IF Z$="IV" LET P=(1-P)*2
15:IF Z$="V" LET P=1-(1-P)*2
16:PRINT Z$;"P(X)=";USING "###.####";P
17:GOTO 1
2Ø:IF X<Ø LET X=-X
21:A=.196854:B=.115194:C=.ØØØ344:D=.Ø19527
22:P=1-.5*(1+AX+BXX+CXXX+DXXXX)¢(-4)
23:RETURN
5Ø:A=.3183:D=Ø:IF E=2 LET A=.4991:D=.Ø518
51:IF E=3 LET A=1.1Ø94:D=-.Ø46
52:IF E=4 LET A=3.Ø941:D=-2.756
53:IF E=5 LET A=9.948:D=-14.Ø5
54:IF E>5 THEN 6Ø
55:X=(G-B)/C:P=1-2*(A/X¢E+D/X¢(E+1))
56:GOTO 62
6Ø:T=(G-B)/C
61:X=T*(1-1/(4E)):X=X/ SQR(1+TT/(2E)):GOSUB 2Ø
  :P=2P-1
          Use the square root sign on the pocket **
62:P=P+(1-P)/2:GOTO 12
```

(In line 61 use the square root sign in place of the words SQR).

SUMMARY

This program provides the user with information about the normal and Student t distribution with a minimum of thinking on the part of the user. It allows you to concentrate on the meaning of what the numbers are trying to tell you, rather than the mechanics of looking up information in a table.

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ASK RICHARD

Richard Kaplan

What will you write about in your new feature, "Ask Richard"?

"Ask Richard" will be written for the computer owner who needs *non-technical* answers to basic computer concepts.

Do you mean I can get answers to the kind of questions that I feel "too stupid" to ask in a computer store?

Yes, I'll answer even the simplest questions — and, unlike some computer salespeople, I won't assume that you already have some knowledge of computers.

And I will be able to understand the answers, even if I have no computer knowledge?

Yes, you will understand the answers, because I'll give all of my explanations in "plain English".

I understand you intend to use a "dialog format". Who will be the person asking the questions?

The question part of my dialog will be derived from my own personal experience dealing with computer users. A large portion of my work at Computronics involves providing technical support over the phone. In talking with people, I have found that many computer owners cannot find answers to *fundamental* questions. Therefore, I will include in "Ask Richard" the kind of questions which I most often hear asked on the telephone.

What if I, a reader of *Computronics*, have a question?

Letters, questions, and suggestions from readers are always welcome. I will try to answer all letters from readers either personally or in print. A self-addressed stamped envelope will speed up this process.

Since you say you will answer questions people are afraid to ask, let's start with one that has been bugging me for a long time. I have a TRS-80 Model III Level II. What's the difference between the model number and the level number?

The first computer ever made by Radio Shack was simply called the TRS-80. It had a programming language called Level I BASIC. Soon after this computer was released, a better programming language was written called Level II BASIC, which was available for an additional cost. Thus, Radio Shack's new top-of-the-line computer was then the TRS-80 Level II.

After the TRS-80 had been available for several years, a new computer was released by Radio Shack called the Model II. The Model II was much more expensive than the first TRS-80 (now called the Model I), but it could do much more complicated functions and store more information on its 8-inch disks (as compared to the Model I's 5¼-inch disks). The Model II's programming language was called Model II BASIC, as it still is called today.

After the Model II, still another computer was released — the Model III. The Model III was (and still *is*) simply an enhanced version of the original Model I. The Model III has its video screen, keyboard, memory, and disk drives all located in one unit, whereas the Model I has separate units for each of these. The Model III is available with the original Level I BASIC or the more expensive, but more powerful, Level II BASIC.

Thus, the model number refers to what the computer looks like. The level number refers to the programming language used in the computer.

To get to the bottom line, should I purchase Level I BASIC or Level II BASIC?

Almost without exception, it is advisable to purchase Level II BASIC, whether for the Model I or Model III.

Why do you say Level II BASIC is better?

For one thing, 99.9" of all BASIC software, particularly business software for the Model I or III, is written in Level II BASIC. This means that if you wish to purchase software written in anything other than machine language, you'll need Level II BASIC. If you wish to write your *own* software, then you really need Level II BASIC.

Why would I need Level II BASIC to write my own software?

Level II BASIC contains many features which make programming much easier. To explain these features in-depth would be beyond the non-technical scope of this column, but some of the features of Level II BASIC include multi-dimensional arrays, complete string handling, and 16-digit accuracy. In short, the difference in price between Level I and Level II (about $100) is well worth the difference between an obsolete machine and state-of-the-art programming.

You mentioned "machine language" a while back. What is this, and should I learn it?

Machine language is the language in which the computer "thinks". As compared to BASIC, which reads very much like English, machine language is very cryptic — it's completely written in 1's and 0's. Needless to say, it is very hard and laborious to use, and you shouldn't worry about learning it. It is definitely *not* recommended for beginners.

Why would anyone want to use machine language?

Machine language is far faster in operation than BASIC. Therefore, programs which require fast speed, such as games, must be written in machine language.

Now that we've discussed the different programming languages available, I still don't know the answer to the most important question: Should I buy the Model I, II, or III?

For starters, the Model I is no longer available. The FCC no longer permits its manufacture in the United States due to its interference with television reception. However, if you can get a good price on a used Model I, this might be a good choice.

Our decision is now left to choosing between the Model II or the Model III. The Model II, which sells for a minimum of $3000 and usually costs $6000 when disk drives and other extras are added, is for very serious business applications. The home hobbyist or small businessman does not have a need for this computer.

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The Model III, which can be bought for as little as $600 without disk drives (cassettes can be used to store programs and data) or as much as $2500 for a 2-disk, 48K system, is probably the best all-around choice in purchasing a computer. There is a tremendous amount of software available for this machine, and it has many applications for both home and business use.

I've heard about the Color Computer and Pocket Computer. Should I consider these?

The Color Computer and Pocket Computer are both relatively inexpensive computers. The Color Computer is an excellent tool for learning programming and learning what personal computing is all about. The Pocket Computer is very good for people who need to solve formulas and do other computing while traveling. Unfortunately, neither of these computers can be used for really serious business applications, although the Color Computer can be used for business on a limited scale if you purchase disk drives.

Speaking of disk drives, what are the advantages of a disk system over a cassette system?

Any computer system needs a method to store programs and data permanently. Cassettes and disks are the two most common media of storage.

A cassette system is a reliable, very inexpensive method of data storage. Unfortunately, it has two inherent disadvantages: (1) Although cassettes are reliable once recorded, the volume setting of your tape recorder is very significant in saving or retrieving data successfully; (2) cassettes operate very slowly.

Disk systems are not dependent upon volume level settings. This means that it is much easier to retrieve information quickly from a disk than from a tape. Disk systems also operate at much faster speeds than cassettes.

I've also heard it said that disks are a "direct access storage device". What does this mean?

In a cassette system, there may be 10 different programs on one cassette. If you wish to find one specific program on the tape, you will have to fast-forward or rewind the tape to the proper position. This type of data retrieval is called "sequential access".

In a disk system, each program has a name on it. To load any one program from the disk, the computer will first search the disk's *directory* to see if the program you want is on the disk, and if so, *where* on the disk it is located. Then the computer can *directly* find and load the program without first loading any others. Thus, disks are a "direct access" medium.

A good analogy would be an ordinary audio cassette versus a phonograph record. With the tape, it would be necessary to play each song *sequentially* (or use the fast-forward) in order to locate any one specific song on the tape. On the other hand, you can play any single song on the record immediately and *directly* by positioning the needle in the correct place.

Now that I'm going to purchase a disk system, I need to know what kind to buy. I've heard of single and double density. What do these terms mean?

Single and double density refer to the amount of data which can be stored on a disk. If information on disk A is more densely stored than information on disk B, disk A will be able to hold more information.

Standard Model I disk drives are single density. This means that approximately 89,600 characters can be stored on one disk. Standard Model III drives are double density. Double density drives can store approximately 184,300 characters on one disk — almost *double* the information. This is how the term "double density" was derived.

Many people have recommended that I install a "Doubler" in my Model I. What is a doubler, and would you recommend it?

A doubler is a device which can be installed in a Model I Expansion Interface to convert the disk system to double density. As a result, you can almost double the capacity of Model I drives.

I strongly recommend the installation of a doubler in the Model I, but *only* if you are reasonably familiar with your computer. The reason for this is that doublers often cause compatibility difficulties.

Why do doublers cause incompatibilities?

A disk written in a double density cannot be read by a single density system (although the reverse is usually possible), without purchasing some sort of utility program. To use double density freely, you need a DISK OPERATING SYSTEM capable of reading disks of differing formats, such as DOSPLUS or NEWDOS/80.

Does this mean that Model I and Model III disks are not directly compatible?

Yes.

I've heard that, even though Model I and Model III disks are not directly compatible, their cassettes are. **Is this true?**

Yes. If you use *low baud* on your Model III you can read or write Model I tapes. (When you turn your computer on, respond "L" to the question "Cass?" on a cassette system or type "POKE 16913,0 <ENTER>" on a disk system.) Therefore, cassettes are one reliable method of transferring information between the Model I and Model III.

You mentioned operating systems. What is an operating system, and can it help me if I own a doubler?

An operating system is necessary for a disk-equipped computer. It is a complicated "master program" that tells the computer how to store, find, and retrieve information on the disks. Different operating systems store the data on disk in slightly different ways, resulting in different "disk formats". TRSDOS is the standard operating system for Radio Shack computers. Other operating systems, such as DOSPLUS and NEWDOS/80, can save data in disk formats which are readable by other computers. (See "Program Conversion" in issue 50 for a more detailed explanation.) An operating system can, for example, write information in double density for owners of a doubler.

What did you mean when you mentioned "cassette baud rate"?

The cassette BAUD rate refers to the speed at which information is loaded to and from cassettes. BAUD is defined as the number of "bits per second" being transmitted. Since there are 8 "bits" in one character, an average of

continued on page 57

ROULETTE IN BASIC

Ken Knecht

If you are in the mood to gamble a bit, you might try this little BASIC program. It will run on the TRS-80 Model I or Model III with or without a disk. It uses graphics, and it is fun to play. The odds are not quite like those of a casino roulette wheel, as some numbers are slightly more likely to occur than others, but since we are just using the game for fun, they are close enough.

You are limited to betting on a number or color — no fancy bets like those in a casino. You can place up to six bets for each spin of the wheel. You start out with $1000.

The program includes instructions and tells you what to do at each point in the game.

If you wish to change the speed of the ball, or if you want to make the ball go farther or not quite so far around the not-quite-round wheel, you can experiment with lines 340 to 370. The Z1 variable determines the time between ball movements and the Z FOR loop size and RND number determine how far the ball moves for each Z1 determined rate of speed. Try my values for a starter.

The ball doesn't quite behave like a casino roulette ball, but it's fun to watch it find its way around the wheel.

Double check all those numbers after you enter the DATA statements. If the roulette wheel doesn't look right or if any bet indicators show up in the wrong place, then check the DATA numbers again. Be sure that you don't actually put a comma at the end of a DATA line. Yes, those numbers above 191 are OK — they are space compression codes.

Be sure to enter RED or BLACK for the color when betting on a color. Also, when entering the amount bet, don't use the dollar sign or any commas. Use even dollar bets; don't use small change, or you might mess up the display and confuse the ball. It has enough trouble finding its way around the wheel with a correct display!

```
1Ø CLEAR1ØØØ:CLS:DEFINTA-Z:PRINT"Program Copyright 1981 by Ken
Knecht":Z1=5ØØ: GOSUB16ØØ:B=1ØØØ:DIMB1(6),B1$(6):GOSUB2ØØØ:
RANDOM
2Ø CLS:GOSUB21ØØ
3Ø PRINT@223,"Bets";
4Ø GOSUB12ØØ:C=1:FORX=1TO6:B1(X)=Ø:B1$(X)="":NEXTX
5Ø PRINT@655,"Your bet (color or number) ";:B1$=""
55 Z$="":Z$=INKEY$:IFZ$=""THEN55
56 IF Z$=CHR$(13)THEN 6Ø
57 IFZ$=CHR$(8)THENIFLEN(B1$)=ITHENB1$="":PRINTZ$;: GOTO 55 ELSE
B1$=LEFT$(B1$,LEN(B1$)-1):PRINTZ$;:GOTO55
58 PRINTZ$;:B1$=B1$+Z$:GOTO55
6Ø IFB1$="DONE"THEN31Ø
7Ø GOSUB1ØØØ
8Ø PRINT@664,"How much ";:B2$=""
82 Z$="":Z$=INKEY$:IFZ$=""THEN82
83 IFZ$=CHR$(8)THENIFLEN(B2$)=1THENB2$="":PRINTZ$;:
GOTO82ELSEB2$=LEFT$(B2$,LEN(B2$)-1):PRINTZ$;:GOTO82
84 IFZ$=CHR$(13)THEN 86
85 PRINTZ$;:B2$=B2$+Z$:GOTO82
86 B1=VAL(B2$):B=B-B1
9Ø IFB<ØTHENGOSUB1ØØØ:PRINT@664,"You don't have that much";:
GOSUB11ØØ: GOSUB1ØØØ:B=B+B1:GOTO5Ø
1ØØ GOSUB13ØØ
11Ø GOSUB12ØØ
12Ø IFB1$="BLACK"THEN18Ø
13Ø IFB1$="RED"THEN19Ø
14Ø IFB1$="Ø"THEN2ØØ
15Ø IFB1$="ØØ"THEN21Ø
16Ø IFVAL(B1$)<1ORVAL(B1$)>36THENGOSUB14ØØ:GOTO5Ø
17Ø RESTORE:FORZ=1TOVAL(B1$):READX:READY:NEXTZ:SET(X,Y):
SET(X+1,Y):GOTO22Ø
18Ø RESTORE:FORZ=1TO72:READX:NEXTZ:FORZ=1TO18:READX:
READY:SET(X,Y):NEXTZ:GOTO22Ø
19Ø RESTORE:FORZ=1TO1Ø8:READX:NEXTZ:FORZ=1TO18:READX:READY :
SET(X,Y):NEXTZ:GOTO22Ø
2ØØ SET(64,6):SET(65,6):GOTO22Ø
21Ø SET(64,42):SET(65,42)
22Ø B1$(C)=B1$:B1(C)=B1
23Ø ONCGOTO24Ø,25Ø,26Ø,27Ø,28Ø,29Ø
24Ø PRINT@284,B1$;:PRINT@29Ø,B1;:GOTO3ØØ
25Ø PRINT@348,B1$;:PRINT@354,B1;:GOTO3ØØ
26Ø PRINT@412,B1$;:PRINT@418,B1;:GOTO3ØØ
27Ø PRINT@476,B1$;:PRINT@482,B1;:GOTO3ØØ
28Ø PRINT@54Ø,B1$;:PRINT@546,B1;:GOTO3ØØ
29Ø PRINT@6Ø4,B1$;:PRINT@61Ø,B1;
3ØØ C=C+1:IFC<7THENGOSUB1ØØØ:GOTO5Ø
31Ø GOSUB1ØØØ:PRINT@664,"All bets are in";
32Ø ONRND(4)GOTO322,324,326,328
322 X1=8:Y1=23:GOTO33Ø
324 X1=64:Y1=3:GOTO33Ø
326 X1=12Ø:Y1=23:GOTO33Ø
328 X1=64:Y1=45
33Ø SET(X1,Y1)
34Ø FORZ=1TO5Ø+RND(25Ø):GOSUB15ØØ:NEXTZ
35Ø FORZ=1TO25+RND(9Ø):GOSUB15ØØ:Z1=1Ø:GOSUB16ØØ:NEXTZ
36Ø FORZ=1TO1Ø+RND(55):GOSUB15ØØ:Z1=75:GOSUB16ØØ:NEXTZ
37Ø FORZ=1TO2Ø+RND(2Ø):GOSUB15ØØ:Z1=15Ø:GOSUB16ØØ:NEXTZ
38Ø IF(Y=2ORY=3)AND(X>53ANDX<76)THEN76Ø
39Ø IF(Y=45ORY=46)AND(X<53ANDX>76)THEN79Ø
4ØØ IFY=6ORY=8ORY=1ØORY=12ORY=15ORY=18ORY=21ORY=24ORY=27OR
Y=3ØORY=33ORY=36ORY=38ORY=4ØORY=42THENGOSUB15ØØ:GOTO4ØØ
41Ø IFX=52ORX=53ORX=6ØORX=61ORX=68ORX=69ORX=76ORX=77THEN
GOSUB15ØØ:GOTO41Ø
43Ø IFX>52THEN6ØØ
44Ø IF(Y=3ORY=4)AND(X>45ANDX<52)THENW=9:W$="R":GOTO88Ø
45Ø IFY=5ORY=6ORY=7THENW=26:W$="B":GOTO88Ø
46Ø IFY=9THENW=3Ø:W$="R":GOTO88Ø
47Ø IFY=11THENW=11:W$="B":GOTO88Ø
48Ø IFY=13ORY=14THENW=7:W$="R":GOTO88Ø
49Ø IFY=16ORY=17THENW=2Ø:W$="B":GOTO88Ø
5ØØ IFY=19ORY=2ØTHENW=32:W$="R":GOTO88Ø
51Ø IFY=22ORY=23THENW=17:W$="B":GOTO88Ø
52Ø IFY=25ORY=26THENW=5:W$="R":GOTO88Ø
53Ø IFY=28ORY=29THENW=22:W$="B":GOTO88Ø
54Ø IFY=31ORY=32THENW=34:W$="R":GOTO88Ø
55Ø IFY=34ORY=35THENW=15:W$="B":GOTO88Ø
56Ø IFY=37THENW=3:W$="R":GOTO88Ø
57Ø IFY=39THENW=24:W$="B":GOTO88Ø
58Ø IFY=41ORY=42ORY=43THENW=36:W$="R":GOTO88Ø
59Ø IF(Y=43ORY=44)AND(X>45ANDX<52)THENW=13:W$="B":GOTO88Ø
```

```
60Ø IF(Y=3ORY=4)AND(X>77ANDX<84)THENW=14:W$="R":GOTO88Ø
61Ø IFY=5ORY=6ORY=7THENW=35:W$="B":GOTO88Ø
62Ø IFY=9THENW=23:W$="R":GOTO88Ø
63Ø IFY=11THENW=4:W$="B":GOTO88Ø
64Ø IFY=13ORY=14THENW=16:W$="R":GOTO88Ø
65Ø IFY=16ORY=17THENW=33:W$="B":GOTO88Ø
66Ø IFY=19ORY=2ØTHENW=21:W$="R":GOTO88Ø
67Ø IFY=22ORY=23THENW=6:W$="B":GOTO88Ø
68Ø IFY=25ORY=26THENW=18:W$="R":GOTO88Ø
69Ø IFY=28ORY=29THENW=31:W$="B":GOTO88Ø
7ØØ IFY=31ORY=32THENW=19:W$="R":GOTO88Ø
71Ø IFY=34ORY=35THENW=8:W$="B":GOTO88Ø
72Ø IFY=37THENW=12:W$="R":GOTO88Ø
73Ø IFY=39THENW=29:W$="B":GOTO88Ø
74Ø IFY=41ORY=42ORY=43THENW=25:W$="R":GOTO88Ø
75Ø IF(Y=43ORY=44)AND(X>77ANDX<84)THENW=1Ø:W$="B":GOTO88Ø
76Ø IFY=2ORY=3THEN8ØØ
77Ø IFX>53ANDX<6ØTHENW=1:W$="R":GOTO88Ø
78Ø IFX>61ANDX<68THENW=37:W$="":GOTO88Ø
79Ø IFX>69ANDX<75THENW=27:W$="R":GOTO88Ø
8ØØ IFX>53ANDX<6ØTHENW=28:W$="B":GOTO88Ø
81Ø IFX>61ANDX<68THENW=Ø:W$="":GOTO88Ø
82Ø IFX>69ANDX<75THENW=2:W$="B":GOTO88Ø
88Ø FORV=1TO1Ø:Z1=15Ø
89Ø PRINT@732,STRING$(2Ø,32);:GOSUB16ØØ
9ØØ W1$="":PRINT@732,W;:IFW$="B"THENW1$="BLACK"
9Ø1 IFW=37THENPRINT@732,"ØØ ";
9Ø2 IFW$="R"THENW1$="RED"
9Ø5 PRINT@737,W1$;:GOSUB16ØØ
91Ø NEXTV
92Ø B1=Ø:L=Ø:B2=Ø:FORX=1TO6:IFB1$(X)="Ø"ANDW=ØTHENB1=B1+36*B1(X):
B2=B2+35*B1(X):GOTO97Ø
93Ø IFB1$(X)="ØØ"ANDW=37THENB1=B1+36*B1(X):B2=B2+35*B1(X):
GOTO97Ø
94Ø IFLEFT$(B1$(X),1)=W$THENB1=B1+2*B1(X):B2=B2+B1(X):GOTO97Ø
95Ø IFW=VAL(B1$(X))ANDW<>0THENB1=B1+36*B1(X):B2=B2+35*B1(X):
GOTO97Ø
96Ø L=L+B1(X)
97Ø NEXTX
98Ø PRINT@732,STRING$(32,2Ø);:IFB2=>LTHENPRINT@728,"You won
$";B2-L;ELSEPRINT@728,"You lost $";L-B2;
99Ø B=B+B1:GOSUB13ØØ:GOSUB12ØØ:Z1=3ØØØ:GOSUB16ØØ:GOSUB1ØØØ:
PRINT@655,"Press any key to continue";:INPUTA$:GOTO2Ø
1ØØØ PRINT@655,STRING$(34,32);:RETURN
11ØØ FORX=1TO2ØØ:NEXTX:RETURN
12ØØ PRINT@792,"You have $";B;:RETURN
13ØØ PRINT@792,STRING$(2Ø,32);:RETURN
14ØØ GOSUB1ØØØ:PRINT@662,"Invalid bet";:GOSUB11ØØ:GOSUB1ØØØ:
RETURN
15ØØ RESET(X1,Y1):IFX1<5ØTHEN152Ø
15Ø5 IFX1>8ØTHEN154Ø
151Ø IFY1<4THEN1565
1515 Y=Y1:X=X1-2:GOTO157Ø
152Ø IFPOINT(X1-2,Y1-1)THENY=Y1:X=X1+2:GOTO157Ø
1525 IFPOINT(X1+2,Y1-1)THENY=Y1:X=X1-2:GOTO157Ø
1528 IFY1>23THEN1535
153Ø Y=Y1-1:X=X1+2:GOTO157Ø
1535 Y=Y1-1:X=X1-2:GOTO157Ø
154Ø IFPOINT(X1-2,Y1+1)THENY=Y1:X=X1+2:GOTO157Ø
1545 IFPOINT(X1+2,Y1+1)THENY=Y1:X=X1-2:GOTO157Ø
155Ø IFY1<23THEN156Ø
1555 Y=Y1+1:X=X1-2:GOTO157Ø
156Ø Y=Y1+1:X=X1+2:GOTO157Ø
1565 Y=Y1:X=X1+2:GOTO157Ø
157Ø IFPOINT(X,Y)THEN15ØØ
158Ø X1=X:Y1=Y:SET(X,Y)
159Ø RETURN
16ØØ FORZ9=1TOZ1:NEXTZ9:RETURN
17ØØ FORZ=1TOY:READX:PRINTCHR$(X);:NEXTZ:RETURN
2ØØØ PRINT:PRINT:PRINT"This is the game of roulette. As in
Los Vegas, the wheel"
2Ø1Ø PRINT"has a Ø, ØØ, and numbers from 1 to 36. You can bet
on a"
2Ø2Ø PRINT"number or a color (RED or BLACK, be sure to use
uppercase for"
2Ø3Ø PRINT"the color entries). Enter the amount bet when
requested."
2Ø4Ø PRINT"the colors pay even odds, the numbers pay 35 to 1
odds. You can"
2Ø5Ø PRINT"place up to six bets. To place less than six bets
enter 'DONE'"
2Ø6Ø PRINT"to finish bet placing. A small graphic block shows
where your"
2Ø7Ø PRINT"colors are, a large block shows a number bet.":PRINT
2Ø8Ø INPUT"Press any key to continue";A$
2Ø9Ø RETURN
21ØØ RESTORE:FORZ=1TO144:READX:NEXTZ
211Ø PRINT@Ø,CHR$(213);:Y=3:GOSUB17ØØ:FORZ=1TO17:
PRINTCHR$(14Ø);:NEXTZ:Y=3:GOSUB17ØØ:PRINT
212Ø Y=38:GOSUB17ØØ:PRINT
213Ø Y=28:GOSUB17ØØ:PRINT
214Ø Y=2Ø:GOSUB17ØØ:PRINT
215Ø Y=22:GOSUB17ØØ:PRINT
216Ø Y=18:GOSUB17ØØ:PRINT
217Ø Y=16:GOSUB17ØØ
218Ø Y=14:GOSUB17ØØ
219Ø Y=14:GOSUB17ØØ
22ØØ Y=14:GOSUB17ØØ
221Ø Y=16:GOSUB17ØØ:PRINT
222Ø Y=18:GOSUB17ØØ:PRINT
223Ø Y=24:GOSUB17ØØ:PRINT
224Ø Y=26:GOSUB17ØØ:PRINT
225Ø Y=42:GOSUB17ØØ:PRINT
226Ø Y=7:GOSUB17ØØ:FORZ=1TO17:PRINTCHR$(176);:NEXTZ:Y=6:
GOSUB17ØØ:RETURN
3ØØØ DATA 96,12,72,6,32,36,96,12,2Ø,25,1Ø8,23,28,14,1ØØ,34,48,
7,8Ø,41,32,12,96,36,48,41
3Ø1Ø DATA 8Ø,7,28,34,1ØØ,14,2Ø,23,1Ø8,25,1Ø4,31,24,17,1Ø8,2Ø,2Ø,
28,91,1Ø,37,38,87,4Ø,41,8,72,42
3Ø2Ø DATA 56,6,91,38,37,1Ø,1Ø8,28,2Ø,2Ø,1Ø4,17,24,31,87,8,41,4Ø
3Ø3Ø DATA 58,6,43,8,34,12,26,17,22,23,22,28,3Ø,34,39,38,5Ø,41
3Ø4Ø DATA 71,6,86,8,95,12,1Ø3,17,1Ø7,23,1Ø7,28,99,34,9Ø,38,79,41
3Ø5Ø DATA 5Ø,7,39,1Ø,3Ø,14,22,2Ø,22,25,26,31,34,36,43,4Ø,58,42
3Ø6Ø DATA 79,7,9Ø,1Ø,99,14,1Ø7,2Ø,1Ø7,25,1Ø3,31,95,36,86,4Ø,71,42
3Ø7Ø DATA 16Ø,176,176,176,176,144,2Ø6,176,176,14Ø,14Ø,134,
131,131,129,16Ø,176,176,14Ø,188,14Ø
3Ø8Ø DATA 14Ø,14Ø,188,14Ø,14Ø,14Ø,188,14Ø,14Ø,14Ø,188,14Ø,176,
176,144,13Ø,131,131,137,14Ø,14Ø
3Ø9Ø DATA 176,176,2Ø2,176,152,142,131,129,128,16Ø,176,184,14Ø,
131,131,143,211,143,131,131,14Ø,18Ø,176
31ØØ DATA 144,128,13Ø,131,141,164,176,199,176,156,135,129,194,
176,14Ø,142,141,223,142,141,14Ø
```

BORN AGAIN COMPUTERY?

Michael Herbert Shadick

The star of this story is one particular TRS-80 which *looks* like any other. And so do the folks who take turns at its keyboard. Yet they are some rather unique operators and programmers. And their TRS-80 is perhaps the first—if not the *only*—born-again computer.

It received its "conversion" about four years ago, according to its owner, Pastor David Lundholm of Hope Baptist Church in tiny Surrey, North Dakota (pop. 361). "When I bought the '80," Lundholm confesses with a grin, "I intended to use it for—well, *secular* purposes. You know, financial management, record-keeping, word processing, some educational games for the kids, and like that." Yet Lundholm soon discovered that the little box of electronics wizardry now at his command could have have a very special function in his life and in the lives of his parishoners. "I discovered," as Lundholm puts it, "that it could help me in my ministry."

Fun and Games and Bibles

From the very first, Lundholm was fascinated by the programmatic possibilities of his TRS-80, espcally as a "painless" teaching tool for some of his younger parishoners.

"I learned BASIC," he recalls, "and worked up and programmed some computer games of my own, based on Bible stories. So, as the kids played the games, they'd learn the stories. Well, it really caught on, out here in Surrey! 'Twas like manna from Heaven, the way they asked me to make more and more Bible games. Some of the Sunday School children even asked me if I could teach them how to make their own games. So before I knew it, I was giving a short course on BASIC—with lessons from the Good Book!"

Godly Graphics

One of the most popular of the Bible-based games involves the story of Moses and the Jewish people's Exodus from Egypt. "When it came to the seven plagues of Egypt," Lundholm reports, "I really pulled out all the stops. You should see the graphics I came up with—especially those *locusts!* And the kids, of course, loved it. They are now getting a much better and more thorough grasp on the Bible, thanks in large measure to the story games which I, and later they, have developed and programmed and *played.*"

Has Lundholm applied TRS-80 computechnology to any other ministerial missions? Indeed he has. In fact, he and some of his adult parishoners have gone so far as to design a series of diversions based on "Dungeons and Dragons"—but with a definite Christian slant.

"A lot of pious people felt that D&D was the work of the devil, or very close to it," Lundholm observed. "And some of those folks are my parishoners! Well, I've long been a D&D fan myself, so I suggested that those folks who were opposed to me playing D&D should help me work up a Christ-centered version of the game. Which we now have! It has all the fun of D&D, without what you might call the devilment. And we all get a kick out of playing it—including some of *them!*"

So what do Lundholm and his flock call their new computer game? What else but—"Keys to the Kingdom." Or KTK, for short.

"I don't know if it all means anything or not," Lundholm adds, "but when I first got my TRS-80, it seemed to need its share of maintenance work, and then some. I mean, it was in the repair shop more often than I care to mention. Yet, since I started using it for more, er, Heavenly purposes, it hasn't given me a lick of trouble! Could somebody up there be trying tell me something?"

One thing is sure: a certain well-used TRS-80 has certainly been, and continues to be, a rich source of blessings, in a certain rural North Dakota parish.

The Lord worketh in electronic ways, His wonders to perform?

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ROULETTE IN BASIC
continued from previous page

```
311Ø DATA 176,194,13Ø,139,172,176,196,176,156,135,129,194,16Ø,
134,131,131,129,227,13Ø,131,131
312Ø DATA 137,144,194,13Ø,139,172,176,194,16Ø,19Ø,135,195,16Ø,
134,131,131,233,131,131,137
313Ø DATA 144,195,139,189,144,128,168,191,129,195,15Ø,131,131,
237,131,131,169,195,13Ø,191
314Ø DATA 148,128,191,149,195,17Ø,131,131,239,131,131,149,195,
17Ø,191,128,191,149,195,17Ø
315Ø DATA 131,131,239,131,131,149,195,17Ø,191,128,171,189,195,
13Ø,151,131,239,131,171,129
316Ø DATA 195,19Ø,151,194,139,189,144,194,13Ø,139,147,237,163,
135,129,194,16Ø,19Ø,135
317Ø DATA 195,13Ø,143,18Ø,144,194,13Ø,139,147,233,163,135,129,
194,16Ø,184,143,129,198
318Ø DATA 131,141,18Ø,144,128,13Ø,131,143,177,176,176,223,176,
176,178,143,131,129,128
319Ø DATA 16Ø,184,142,131,2Ø1,131,141,164,176,194,13Ø,137,14Ø,
172,176,194,176,211,176,194
32ØØ DATA 176,156,14Ø,134,129,194,176,152,142,131,2Ø4,13Ø,131,
141,14Ø,176,176,144,128
321Ø DATA 131,131,139,14Ø,14Ø,176,188,176,176,176,188,176,176,
176,188,176,176,176,188
322Ø DATA 176,14Ø,14Ø,135,131,131,128,16Ø,176,176,14Ø,142,131,
129,21Ø,13Ø,131,131,137,14Ø
323Ø DATA 14Ø,14Ø,14Ø,134,131,131,129
```

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SERIOUS EDTASM

Faster and Easier Assembler Programming

Steve Brown

If you're an assembler programmer and know your bits from your bytes, or if you use Radio Shack's EDTASM, then this article is for you. It will show you an easier and faster way to create an assembler program.

After becoming the proud owner of Radio Shack's EDTASM package, I quickly found out that there was a problem. To execute the code written in EDTASM you dump the assembled code to tape and then reload it. Reloading the assembled code wipes out EDTASM and the source code. This forces you to reload EDTASM and the source code after each execution of assembled code.

The problem is that EDTASM doesn't allow source code and assembled code both in memory at the same time. The solution is to "fool" EDTASM by sticking the assembled code which was headed for tape into high memory. This allows both source code and assembled code to be in memory at the same time. Bingo! Now that both source and assembled code are in memory together, there is no reason to dump and reload the code repeatedly. Instead, you can create your source code, assemble it, execute it, and still be in EDTASM. This modification has cut my programming time in half.

How to Modify EDTASM

1) Load EDTASM.
2) Type in the program shown in Listing #1.
3) Assemble the program—call it MODASM.
4) Dump the assembled code to tape (and save this tape).

Any time you want to use the modified EDTASM:
1) Load EDTASM
2) Load MODASM
3) Type in /18058

How to Use Modified EDTASM

There are only four differences from EDTASM:

1) You must use one and only one ORG statement. It must be the first line of code and must be 7800H.

2) When you assemble the code, instead of "READY CASSETTE" appearing on the screen, "READY CASSETTE OR DUMP (C/D)?" will appear. If you are finished and wish to dump the assembled code to tape, press "C". If you want to dump the assembled code to high memory, press "D".

3) To execute the code stored in high memory, press "B" and the ENTER key.

4) The instruction JP 46DDH must appear in your source code. This instruction returns control to EDTASM from high memory. If this instruction isn't executed, control will not return to EDTASM.

A Sample Run

1) Load EDTASM.
2) Load MODASM (created in step #4 of "How to Modify EDTASM" above).
3) Type in /18058.
4) Type in the program in listing #2.
5) Type in a XXX.
6) After prompt press "D".
7) After prompt press "B".
8) Type in A XXX.
9) After prompt press "C".

These programs were written on a TRS-80 Model I 16K Level II computer. They would probably also work on a Model III.

```
ØØØØ1          ORG     4699H
ØØØØ2 START    LD      HL,76FFH
ØØØØ3          LD      (4113H),HL
ØØØØ4          ORG     493ØH
ØØØØ5          DEFW    78ØØH
ØØØØ6          ORG     4D2EH
ØØØØ7          CALL    77ØØH
ØØØØ8          ORG     5297H
ØØØØ9          CALL    77Ø6H
ØØØ1Ø          ORG     77ØØH
ØØØ11          CALL    NORML
ØØØ12          JP      4F25H
ØØØ13          LD      HL,MSG
ØØØ14          LD      DE,3FCØH
ØØØ15          LD      BC,3Ø
ØØØ16          LDIR
ØØØ17 KEYIN    LD      A,(38Ø1H)
ØØØ18          BIT     4,A
ØØØ19          JR      NZ,SPECL
ØØØ2Ø          BIT     3,A
ØØØ21          JR      Z,KEYIN
ØØØ22          CALL    NORML
ØØØ23          JP      4F25H
ØØØ24 SPECL    LD      IX,438DH
ØØØ25          LD      (IX),ØC3H
ØØØ26          LD      (IX+1),ØB8H
ØØØ27          LD      (IX+2),77H
ØØØ28          LD      HL,Ø
ØØØ29          LD      (77FCH),HL
ØØØ3Ø          LD      HL,ØØ85H
ØØØ31          LD      (77FEH),HL
ØØØ32          JP      4F25H
ØØØ33 NORML    LD      IX,438DH
ØØØ34          LD      (IX),ØEH
ØØØ35          LD      (IX+1),Ø8H
ØØØ36          LD      (IX+2),Ø57H
ØØØ37          RET
ØØØ38 MSG      DEFM    'READY CASSETTE OR DUMP (C/D) ?'
ØØØ39          ORG     77B8H
ØØØ4Ø          LD      D,A
ØØØ41          LD      A,(77FDH)
ØØØ42          CP      Ø
ØØØ43          LD      A,D
```

```
00044          JR      NZ,RUNEM
00045          CP      78H
00046          JR      NZ,POPEM
00047          LD      (77FDH),A
00048 POPEM    POP     AF
00049          POP     DE
00050          POP     BC
00051          POP     HL
00052          RET
00053 RUNEM    LD      IX,77FCH
00054          LD      HL,(77FCH)
00055          LD      (HL),A
00056          LD      A,(IX+2)
00057          CP      6
00058          JP      M,CHECK5
00059          DEC     (IX+2)
00060          INC     HL
00061          LD      (77FCH),HL
00062          JR      POPEM
00063 CHECK5   DEC     (IX+2)
00064          JR      NZ,POPEM
00065          LD      (IX+2),85H
00066          JR      POPEM
00067          END     START
```

Listing #1: Source code for MODASM.

```
00001          ORG     7800H
00002          CALL    01C9H
00003          LD      IX,3C00H
00004          LD      D,0FFH
00005 LOOP     LD      B,10H
00006          CALL    0060H
00007          LD      (IX),0FFH
00008          INC     IX
00009          INC     IX
00010          INC     IX
00011          DEC     D
00012          JR      NZ,LOOP
00013          CALL    01C9H
00014          JP      46DDH
00015          END
```

Listing #2: Program for a sample run.

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ASK RICHARD

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5 characters per word, and 60 seconds in one minute, 300 baud would be equal to about 300/8/5*60 words per minute (roughly 450 words per minute).

The Model I cassette operates at 500 baud. The Model III can use either 500 or 1500 baud, so it can read Model I cassettes at the slower speed.

Getting back to our discussion on disk drives, should I purchase one drive or two?

I would *always* recommend that you purchase two drives.

Why do you so strongly support the purchase of two drives?

For one thing, two drives greatly aid in making copies, or "backups", of a disk. If you own two drives, the computer can automatically make a copy of a disk from one disk drive to the other. If you only own one drive, the computer will have to read in a portion of the information on one disk (the "Source" disk) and you must switch disks before the computer can store the information on the other disk (the "Destination" disk). Once the information is stored on the Destination disk, you'll have to swap disks again so that the computer can read more of the information from the Source disk. The result is that a single backup with a one-drive system will require *several* switches of diskettes.

Are there any other advantages to owning a two-drive disk system?

YES. Perhaps the most significant need for two drives arises when you try to run business software on a one-drive system. It is very cumbersome to keep programs and data all on one disk drive, and very often there is not enough data storage space to do this on a single Model I or Model III disk, resulting in disk swaps while running a program.

So what is the bottom line concerning how many disk drives to purchase?

If you intend to use your system for games, education, or personal uses, you can compromise with a one-drive system, although making backups will always be difficult. If you intend to use your computer for any serious application, particularly business, it is ridiculous to try to use a one-drive system on the Model I or Model III (it is possible, but still not recommended, to run business programs on a single-drive Model II computer).

Questions from readers on all aspects of personal computing are welcomed. I will try to reply to all inquiries, either personally or through this column. Please enclose a self-addressed, stamped envelope with your letter.

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H & E Computronics welcomes letters on any subject. If you wish a personal reply, please enclose a self-addressed, stamped envelope.

H & E Computronics also welcomes readers to submit programs, articles, or reviews for publication. Please address correspondence to:

The Editor
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50 North Pascack Road
Spring Valley, New York 10977

Please submit programs (and articles, if prepared on a word processor) on media (cassettes or diskettes). Also please indicate the system it was prepared on, and include any necessary instructions. ■

PROGRAM CONVERSION
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same principle may be applied to many other microcomputers.

```
5 REM APPLESOFT RS-232 INPUT PROGRAM
6 REM TO RECEIVE TRS-8Ø OR OTHER PROGRAMS ON AN APPLE II
7 REM  BY RICHARD KAPLAN
8 REM    H & E COMPUTRONICS
9 REM    5Ø N. PASCACK ROAD
1Ø REM   SPRING VALLEY, NY  1Ø977
11 REM 11/1/82
15 DIM A$(5ØØØ):I=Ø
2Ø D$=CHR$(4):REM CTRL D
3Ø HOME:TEXT
4Ø PRINT "THIS PROGRAM ALLOWS YOU TO RECEIVE"
5Ø PRINT "AN APPLESOFT PROGRAM VIA AN RS-232"
6Ø PRINT "CONNECTION."
7Ø PRINT:I=I+1
8Ø PRINT "(PRESS THE RETURN KEY TO QUIT.)
9Ø PRINT "TRANSMIT STRING # ";I;": ";
95 I=1
1ØØ GET A$:A=ASC(A$):IF A>96 THEN A$=CHR$(A-32)
1Ø5 A$(I)=A$(I)+A$:PRINT A$;
11Ø IF A$=CHR$(255) OR A$=CHR$(13) THEN A$="":PRINT:I=I+1
   :GOTO 1ØØ
113 IF LEFT$(A$,1)="." THEN 13Ø: REM TRANSMIT A "." TO END
115 GOTO 1ØØ
12Ø PRINT
13Ø PRINT "WHAT FILE NAME?";:REM PROGRAM FILE NAME
135 INPUT N$
14Ø PRINT D$;"OPEN";N$
15Ø PRINT D$;"DELETE";N$
16Ø PRINT D$;"OPEN";N$
17Ø PRINT D$;"WRITE";N$
18Ø PRINT I-1
19Ø FOR I=1 TO I-1
2ØØ PRINT A$(I)
21Ø NEXT
22Ø PRINT D$;"CLOSE";N$
```

Terminal programs are widely available for the APPLE, IBM, and all three TRS-80's. (In fact, a terminal program is included as a utility with Model II TRSDOS.) This is perhaps the most common method of interfacing computers

USING A MODEM

As a last resort, a modem can almost always be used to transfer programs between computers. As long as each computer can be connected to a modem, and as long as a terminal program is available for each machine, it is *always* possible to transfer programs between two machines with the use of a modem.

In order to connect a modem to a computer, a DB25 extension cable is needed, as described above. However, *this cable need not and should not be re-wired as required for a direct transfer.* A simple extension cable should be used.

As with a direct transfer, a smart terminal package should be purchased. The documentation that comes with the terminal software should provide instructions after this stage.

CONCLUSION — A FREQUENCY CHANGE

This will be the last regular appearance of the "Program Conversion" series. For two reasons, I will still be writing this column, but on an irregular basis.

I believe that in the eleven installments of this series to date I have covered most topics involved in TRS-80 program conversion. When new computers and/or operating systems become available, I will continue to write about program conversion.

Another reason I will no longer write this column on a regular basis is that I will be devoting my energy to a new feature — "Ask Richard" — which appears for the first time in this issue. Unfortunately, time restrictions make it impossible for me to write two regular monthly features simultaneously.

I have enjoyed writing this series so far — and I have particularly enjoyed reader feedback on my techniques. If you have a question about program conversion, or about any other topic pertaining to the Model I, Model II, Model III, APPLE, PET, IBM, ATARI, OSBORNE, or CP/M, I am still actively soliciting questions. Until next time, *FAREWELL!!*

Richard Kaplan
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Spring Valley, NY 10977 ■

DISK CHECKBOOK MAINTENANCE SYSTEM
continued from page 47

```
221Ø PRINT #1,E;",";CN$(Ø);",";B(Ø);D$(Ø);","
222Ø FOR I=1 TO E: PRINT #1,CN$(I);",";D$(I);",";P$(I);",";
T%(I);",";A(I);",";B(I): NEXT I: CLOSE : RETURN
223Ø 'SUB FOR DISK FILE READ
224Ø INPUT"WHAT MONTH'S CHECKS DO YOU WANT (1-12)";A3: IF
A3<1OR A3>12 THEN 224Ø
225Ø A3=INT(A3): A3$=STR$(A3): B3=LEN(A3$):
A4$=RIGHT$(A3$,B3-1)
226Ø DF$="CKS"+A4$+"/TXT"
227Ø OPEN "I",1,DF$
228Ø INPUT #1,E,CN$(Ø),B(Ø),D$(Ø)
229Ø FOR I=1 TO E: INPUT #1,CN$(I),D$(I),P$(I),T%(I),A(I),
B(I): NEXT I: CLOSE : RETURN
```

David White
27833 West Bayview Dr.
Ingleside IL 60041 ■

ALPHA PROGRAM

continued from page 23

```
10 REM ALPHA PROGRAM
20 REM CREATED BY
30 REM FRANKLIN O. BANADOS, GUIDO A. CONCHA
40 REM PAUL L. CONTRERAS, JOSE R. CORBALAN
50 REM
60 CLS : PRINT : PRINT : PRINT CHR$(23);"    ALPHA"
70 PRINT : PRINT : PRINT : PRINT TAB(5);"PROGRAM"
80 FOR I=1 TO 150: NEXT I
90 DIM K(6),AL(6),D$(6)
100 D$(1)="PH": D$(2)="ALPHA 0": D$(3)="ALPHA 1": D$(4)="ALPHA 2"
110 D$(5)="ALPHA 3": D$(6)="ALPHA 4"
120 Z$="##.#"
130 CLS
140 INPUT "INPUT NUMBER OF REPLACEABLE HYDROGENS";NH
150 PRINT : PRINT
160 PH=0
170 IF NH=1 THEN 190
180 PRINT "INPUT EACH";NH;"ACIDITY CONSTANT'S VALUES IN
DECREASING ORDER": GOTO 200
190 PRINT "INPUT THE ACIDITY CONSTANT"
200 FOR I=1 TO NH
210 INPUT K(I)
220 NEXT I
230 CLS
240 NU=NH+2
250 FOR I=1 TO NU
260 PRINT D$(I);"     ";
270 NEXT I : PRINT : PRINT
280 DE=0
290 CT=1
300 H=(1/(10↑PH))
310 REM
320 REM DENOMINATOR CALCULATIONS
330 REM
340 CO=K(1)
350 DE=H+CO
360 IF NH=1 THEN 440
370 M=NH-1
380 FOR I=1 TO M
390 L=I+1
400 DE=DE*H
410 CO=CO*K(L)
420 DE=DE+CO
430 NEXT I
440 AO=(H↑NH)/DE
450 FOR I=1 TO NH
460 LL=NH-1
470 CT=CT*K(I)
480 AL(I)=(CT*(H↑LL))/DE
490 NEXT I
500 PRINT USING Z$;PH;
510 PRINT AO;
520 M=19
530 FOR I=1 TO NH
540 PRINT TAB(M);AL(I);
550 M=M+14
560 NEXT I
570 PH=PH+0.1
580 PRINT
590 IF PH<=14 THEN 280
600 END
```

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SURNAME CONVERSION

Nadine Willems

Do your friends, (or customers if you're lucky), like to have an alphabetic printout of their mailing lists? If so, this program will allow you to convert a mailing list to a list with surnames first, which can then be sorted by your favorite sort, and reconverted to the surname in its normal position.

For example: "Miss Jane Doe 15 Brown Street Barrie Ontario Canada L4M 4S6" will be converted to "Doe Miss Jane" with the rest of the information remaining as is. The sort will use DOE instead of Miss. After the sort, it can be reconverted to Miss Jane Doe, etc.

In order to save time, it is preferable that if on the original entry, the surname is entered first (remember, NO COMMAS); however, for a list already in effect, use the conversion to surname first, and SAVE the list. When ready to print, bring it in, make any necessary additions, corrections, and deletions; then sort and SAVE BEFORE PRINTING. Convert the list to the surname in end position, and print.

Using 180 full mailing records—4 strings each, I find it takes about 12.1 seconds for the conversion. Memory used is approximately 27. The more string space cleared, the faster the conversion. Play around with the memory in your program by using PRINT MEM at strategic points in order to determine the least memory you need to run the program, then clear the remaining memory into string space.

Let's look at the program using Miss Jane Doe as our example. The variable "A" has been defined as a string, which is the value for the full name. NI is the total number of full records.

Line 3380 takes care of deletions; otherwise the program will crash. Line 3480 Provides for a ONE name person. (I had the program crash for days before I discovered that there were one name people or businesses!!)

Lines 3400 and 3420: X will equal the length of Miss Jane Doe, which is 13. F will equal the first space encountered in the name.

Lines 3420 to 3500 loop from E of Doe until the first space is found. Line 3460 uses K as the variable; when the space is found, on the 4th pass, the program takes you to 3520.

Line 3520 now says that Miss Jane Doe = Right length of the name (X) less K which is EOD and SPACE which = 4; plus a space (F) plus the Left portion (Miss Jane), 4 (K) -1. The -1 is to get rid of the space left after JANE.

The CONVERSION TO SURNAME LAST works in the same manner, BUT it does not need to loop for the name, as the first space found by the INSTR function is the end of the surname. For this reason, this conversion takes a little less time.

TWO factors to note:

a) This program will not take care of the titles which follow surnames such as Jr., or Ph.D., etc.

b) It takes more time for the second conversion if two conversions are processed in the same memory; therefore, it is more efficient to SAVE the "SURNAME FIRST" list, or save both.

This program is written for a TRS-80 Model 1 with disk drives.

```
8Ø DEFSTR A-H:DEFINT I-N,X-Z
336Ø FOR N = Ø TO NI
338Ø IF A(N) = "" GOTO 354Ø
34ØØ X=LEN(A(N))
342Ø F=CHR$(32)
344Ø FOR I=X TO 1 STEP -1
346Ø K=INSTR(I,A(N),F)
348Ø IF K   Ø GOTO 352Ø
35ØØ NEXT I
351Ø IF K=Ø GOTO 354Ø
      NECESSARY FOR 1-WORD NAMES
352Ø A(N)=RIGHT$(A(N),X-K)+F+
        LEFT$(A(N),K-1)
354Ø NEXT N
356Ø PRINT"CONVERSION COMPLETE"


376Ø FOR N = Ø TO NI
378Ø IF A(NI)="" GOTO 39ØØ
38ØØ X=LEN(A)
382Ø F=CHR$(32)
384Ø K=INSTR(A(N),F)
386Ø IF K=Ø GOTO 39ØØ
388Ø A(N)=RIGHT$(A(N),X-K)+F+
       LEFT$(A(N),K-1)
39ØØ NEXT N
392Ø PRINT"CONVERSION COMPLETED"
```

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Barrie, Ontario
Canada L4M 4S6 ■

JACK AND JILL

Asa F. Tift

This program is for a 16K TRS-80 Model III only. It will not work on a Model I.

The Model III has a set of special characters which may be brought out by means of CHR$(21) and CHR$(192 to 255). CHR$(21) toggles between special characters and space compression characters, so it must be used at least twice in one program: before any special characters are used, and after all special characters are finished.

This silly little program illustrates the use of several of them.

```
5 CLS
1Ø PRINT TAB(1Ø),"Jack and Jill went up the hill,"
2Ø PRINT TAB(1Ø)," To fetch a pail of water,"
```

continued on page 62

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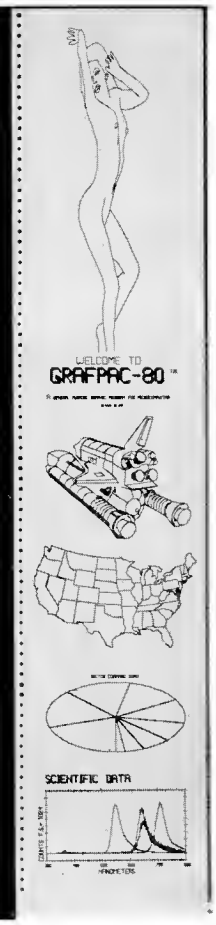

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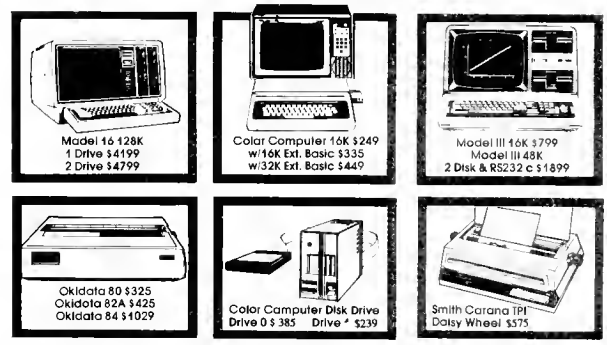

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JACK AND JILL

continued from page 60

```
3Ø PRINT TAB(1Ø),"Jack fell down and broke his crown,"
4Ø PRINT TAB(1Ø)," And Jill came tumbling after."
5Ø X=33:Y=47:FOR W=1 TO 33:X=X+1:Y=Y-1:SET(X,Y):NEXT W
6Ø X=66:Y=14:FOR W=1 TO 33:X=X+1:Y=Y+1:SET(X,Y):NEXT W
7Ø FOR X=96Ø TO 1Ø22:PRINT@X,CHR$(191);:NEXT X
8Ø PRINTCHR$(21);
9Ø A$=CHR$(253):B$=CHR$(254):C$=CHR$(219)
1ØØ PRINT@896, A$+B$+C$;
1Ø5 FOR X=896 TO 9Ø9 STEP 3: PRINT @X,"   "A$+B$+C$;: FOR T=1
TO 5Ø:NEXT T:NEXT X
1Ø7 D$=CHR$(244)+CHR$(245)+CHR$(246)
1Ø8 PRINT@12,D$;
11Ø J=Ø: FOR I=1 TO 1Ø: FOR T=1 TO 5Ø: NEXT T :J=J+1.5 :
PRINT @913-I*64+J,C$;
12Ø PRINT@913-I*64+J-1,B$;
13Ø PRINT@913-I*64+J-2,A$;
14Ø PRINT@972-I*64+J+1.5,"   ";
145 NEXT I
15Ø FOR T=1 TO 1ØØØ:NEXT T
153 PRINT@12,"   ";
157 PRINT@14Ø,D$;
16Ø PRINT@286," ";
17Ø PRINT@35Ø,A$;
18Ø PRINT@35Ø," ";
19Ø PRINT@413,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@413," ";
2ØØ PRINT@348,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@348," ";
21Ø PRINT@41Ø,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@41Ø," ";
22Ø PRINT@474,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@474," ";
23Ø PRINT@538,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@538," ";
24Ø PRINT@472,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@472," ";
25Ø PRINT@4Ø6,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@4Ø6," ";
26Ø PRINT@34Ø,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@34Ø," ";
27Ø PRINT@274,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@274," ";
28Ø PRINT@336,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@336," ";
29Ø PRINT@272,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@272," ";
3ØØ PRINT@2Ø8,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@2Ø8," ";
31Ø PRINT@27Ø,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@27Ø," ";
32Ø PRINT@332,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@332," ";
33Ø PRINT@394,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@394," ";
34Ø PRINT@33Ø,A$;:FOR T=1 TO 2Ø:NEXT T:PRINT@33Ø," ";
35Ø FOR X=394 TO 9Ø6 STEP 64: PRINT @X,A$;: FOR T=1 TO 1Ø:
NEXT T: PRINT @X," ";:NEXT X
36Ø PRINT@9Ø6,A$;
365 PRINT@288," ";
37Ø PRINT@35Ø,C$;:FOR T=1 TO 2Ø:NEXT T:PRINT@35Ø," ";
38Ø FOR Y=349 TO 33Ø STEP-1: PRINT @Y,C$;: FOR T=1 TO 2Ø:
NEXT T: PRINT @Y," ";
39Ø NEXT Y
395 PRINT @32Ø,"WATER PAIL"C$;: FOR T=1 TO 15Ø: NEXT T: PRINT
@32Ø,"          ";
4ØØ FOR Z=33Ø TO 842 STEP 64: PRINT @Z,C$;: FOR T=1 TO 2Ø:
NEXT T: PRINT @Z," ";
41Ø NEXT Z
42Ø PRINT@777,C$;:FOR T=1 TO 2Ø:NEXT T:PRINT@777," ";
43Ø PRINT@84Ø,C$;:FOR T=1 TO 2Ø:NEXT T:PRINT@84Ø," ";
44Ø PRINT@9Ø3,C$;
45Ø PRINT@835,"OOOOOOH MY CROWN";
46Ø FOR T=1 TO 3ØØ:NEXT T:PRINT@835,"                ";
465 PRINT@14Ø,"   ";
467 PRINT@2Ø4,D$;
47Ø FOR W=287 TO 961 STEP(64-1.5): PRINT @W,B$;: FOR T=1 TO
2Ø: NEXT T:PRINT@W," ";
48Ø NEXT W
49Ø PRINT@(W-64),B$;
5ØØ PRINT@2Ø4,"   ";
51Ø PRINTCHR$(21);
52Ø FOR T=1 TO 2ØØØ:NEXT T
53Ø CLS
54Ø PRINT"PRESS (1) TO SEE JACK AND JILL AGAIN."
55Ø PRINT"PRESS (2) TO EXIT PROGRAM."
56Ø V$=INKEY$
57Ø IF V$="1" THEN GOTO 5
58Ø IF V$="2" THEN CLS:END
59Ø GOTO 56Ø
6ØØ REM ASA F. TIFT
61Ø REM 32ØØ TROWBRIDGE ROAD
62Ø REM ALBANY, GEORGIA 317Ø7
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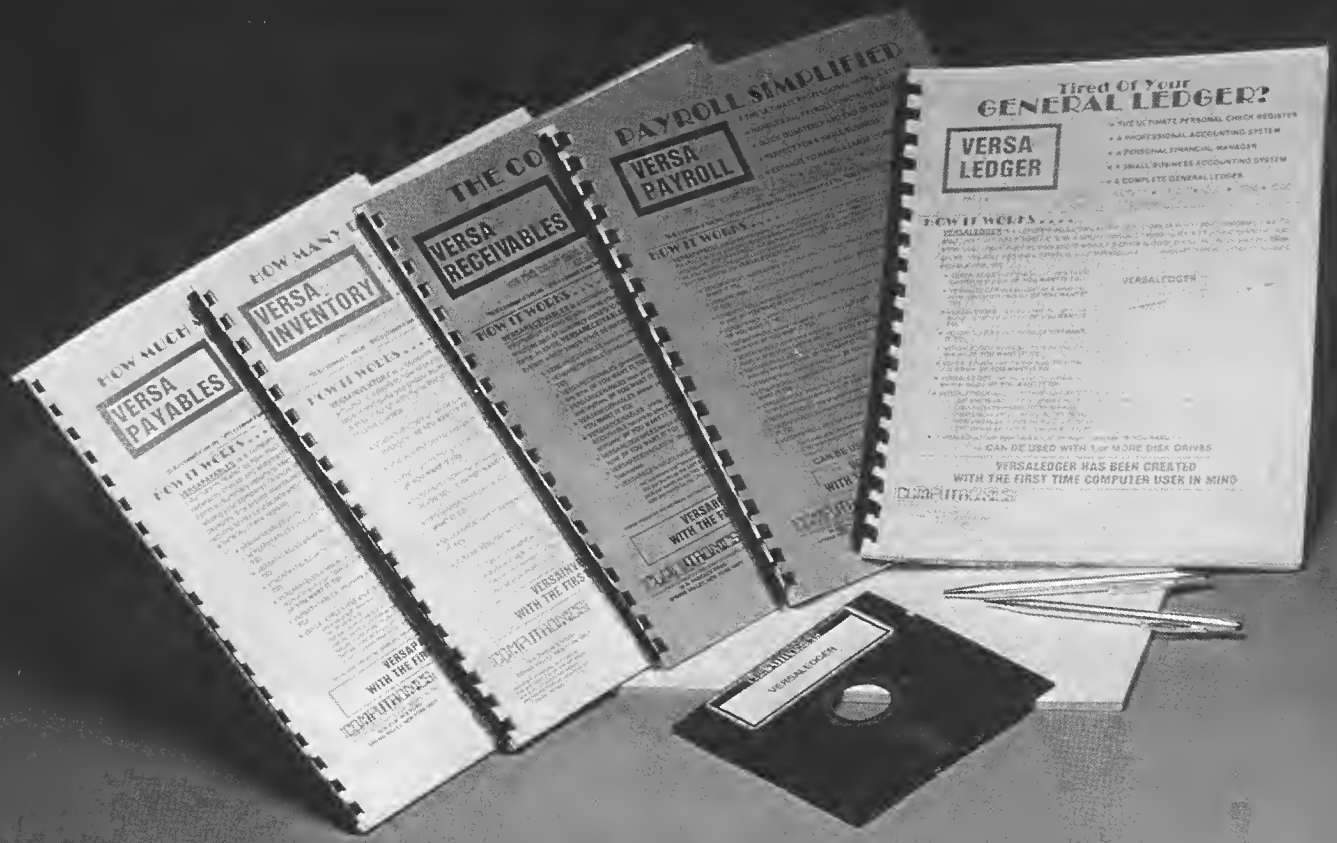

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	Present home address (Number and street, including apartment number, or rural route)		Spouse's social security no.
	City, town or post office, State and ZIP code		Your occupation ▶ / Spouse's occupation ▶

Presidential Election Campaign ▶ Do you want $1 to go to this fund? . . . . . Yes No
If joint return, does your spouse want $1 to go to this fund? . . . Yes No

Note: *Checking "Yes" will not increase your tax or reduce your refund.*

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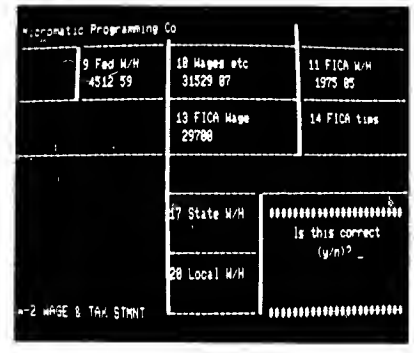

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- Manual includes 1982 tax forms, information on special tax areas, lists of possible deductions, and glossary of tax terms
- Completes long and short forms including itemized deductions, excess FICA, earned income credit, community property, tax calculation (comparing all possible filing statuses in one run)
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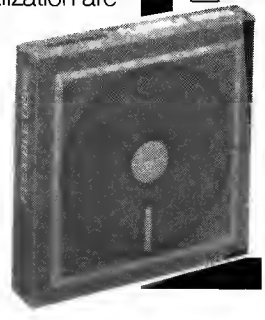

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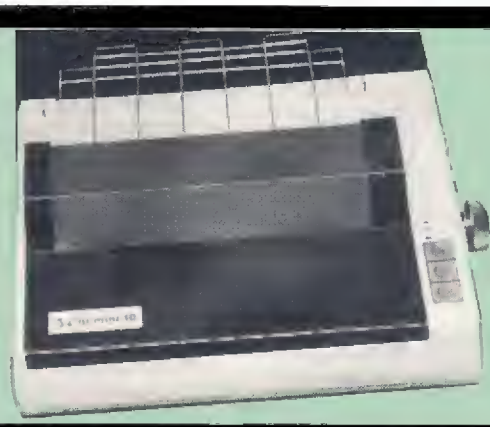

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